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COMMONWEALTH OF PENNSYLVANIA  
**BOARD OF FISH COMMISSIONERS**

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**BIENNIAL REPORT**

For the Period Ending  
**May 31, 1940**

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**HARRISBURG, PENNSYLVANIA**  
**1940**

B639.3  
P.S.C  
1938/1940



last year. Pymatuning and the Delaware River are under jurisdiction of various states and it will take some time to accomplish uniform regulations.

#### **CONSTRUCTION AT HATCHERIES**

During the last biennium the following important work was done at the various hatcheries, and with the program as outlined above, we should be in a position to increase the number of large fish which will be distributed:

**PLEASANT GAP, BELLEFONTE**—Twenty-two dual purpose ponds were constructed to be used during most of the year for propagation of warm water species—in winter months they will be used for holding trout for spring distribution.

**HUNTSDALE**—Completion of twenty-five large ponds for bass and warm water fish production—new modern hatching house in operation completely equipped with metal supply and hatching troughs. Acquisition of additional property below present property for continuation of propagating ponds. This new development is approximately one-half mile in length. Installation of aquarium display room for exhibition of native fish of Pennsylvania.

In the two years 1938 and 1939 this plant has been increased from 28 to 155 ponds and will have the facilities for propagating all species of fish. This hatchery is one of the outstanding in the State.

**CORRY**—Adoption of a program which will materially increase the output. Remodeling of the ice house by converting it into a modern cold storage plant.

**TIONESTA**—Temporary conversion dams replaced by permanent dams—plans completed for installation of cold storage plant.

**PLEASANT MOUNT**—Installation of 40 steel tanks for raising bass. Operations started on Millers and White Oak Pond. This program was started in 1939 with the purpose of bringing this hatchery back to the very prominent place it occupied previously.

We have under way at the present time a construction program which most assuredly, when completed, will give Pennsylvania the largest hatchery layout in the United States. The WPA projects total \$842,958, and the work is being done at the following hatcheries:

Bellefonte, Centre County  
Corry, Erie County  
Huntsdale, Cumberland County  
Pleasant Mount, Wayne County  
Pymatuning Sanctuary, Crawford County

#### **DISTRIBUTION**

As this report did not go to press until after the first of the year, the Board felt that the distribution figures for 1940 should be included as a part of the Accomplishments because it has marked one of the greatest years in the advance of hatching, propagation and distribution in

the history of the Commission, and all records have been kept on a calendar basis instead of fiscal, which is done in most State reports.

As set forth in the Accomplishments, the Board is now propagating catfish, sunfish, yellow perch and bass in narrow troughs and baskets which are placed in the various hatching buildings, ponds and lakes under the control of the Board. It has revolutionized the work, which is shown in the report. We would particularly call your attention to the size of the fish in the statement that follows:

#### WARM WATER FISH

The production of black bass has jumped from 254,101 in 1939, to 548,988 in 1940. This is a real accomplishment as 1940 was one of the most peculiar seasons in the history of the State. The Board decided as a matter of policy, to stock larger fish but fewer of them. As an illustration, in 1939 we raised 941,447 catfish that had a total weight of 60 tons. During 1940 our distribution of catfish amounted to 498,793 and these fish weighed 113 tons. Our total distribution for this year will show a reduction in the number of fish planted but the total weight will be greatly increased.

For the first time in the history of the Commission yellow perch were raised to fingerling size. During 1940 the Board raised and stocked 228,895 yellow perch; the majority averaged 3½ to 4 inches. Our future stocking of yellow perch will show an increase in the number of larger fish planted and we believe much better fishing will be had by discontinuing the policy of stocking all fry and concentrating on stocking from fingerling to takeable size fish. The program as outlined will require time but with additions to our hatcheries it will soon be possible to distribute all fingerling and larger size perch.

#### REPORT OF DISTRIBUTION 1940

Species	Size	Number
Brook, Brown and Rainbow Trout	6" to 19"	1,393,330
Trout Fingerlings		2,560,000
Black Bass	1" to 14"	548,988
Bream	2" to 8"	326,770
Catfish	3" to 11½"	498,793
Pike Perch	13" to 24"	2,540
Yellow Perch	2¾" to 8"	228,895
Minnows	3" to 6"	81,320
Pickerel	6" to 20"	2,982
Suckers	3" to 18"	39,935
Frog Embryo		149,506
Miscellaneous		102,162

In addition the Board distributed 25,708,600 Pike Perch, 309,254,600 Yellow Perch, and 12,000,000 Cisco in the fry stage.

The distribution of legal size trout amounted to 188 tons and approximately 1,200,000 legal size trout were being held at the hatcheries for the 1940 fishing season.

#### LEGISLATION

An important amendment to the Fish Code was Act No. 363, making it unlawful for any person to make, sell or have in possession a net larger than four (4) feet square or four (4) feet in diameter without a permit therefor issued by the Board.

This amendment was recommended by the Federation of Sportsmen owing to the fact that many arrests were being made in the northeastern section of the Commonwealth where seines and large nets are being used, and under the present law the fine was only \$20.00. As amended the Board can assess a fine of \$100.00 for every net which is not properly registered, and if those violating have fish in their possession, additional penalties can also be imposed.

Another popular amendment was that which takes the size limit and season from rock bass. Complaints were received from all sections of the State that before the opening of the black bass season thousands of these fish were being caught and unfortunately a great many fishermen confused them with the sunfish. After making a field study over a period of two years, it was decided by the Board to remove the restrictions, and apparently it has met with approval.

#### ADDITIONAL FISHING WATERS

During the last biennium 598 acres of water and 107 miles of stream were opened to the public in addition to those waters which had always been fishable. The Board also purchased Big Spring, located at Springfield, Cumberland County. This now belongs to the fishermen of Pennsylvania and will always be open to the public.

## **REPORT OF C. R. BULLER**

**Chief Fish Culturist**

### **FISH CULTURAL ACTIVITIES**

#### **STOCKING LARGER FISH**

The Board of Fish Commissioners has had its field agents making extensive studies of fish conditions in the State. These studies have resulted in a change of the stocking system to try to meet conditions as they exist today. Each year the fishing population is increasing while due to drought and other factors, the natural annual fish yield in the



Hatchery Building, Corry

lakes, rivers, and streams is becoming less. From what meager facts can be learned, the natural fish yield was but a few pounds per acre when the waters were at their best. With the decrease in this natural yield, plus the increased number of fishermen, the old method of stocking fingerling fish in the lakes and rivers will not suffice.

The same factors that have placed checks upon the yield of fish have also been detrimental to the many forms of life that go to make up the food of the game fish. In addition to this, trout streams, rivulets, major bass streams and many lakes and ponds have been raped for the larger forms of fish food organisms to satisfy the demands of the bait fishermen. As a rule the denser fishing population is in the industrial sections of the State where the water areas are small or of an inferior quality. Many of those who reside in these sections do not have the

facilities to travel distances to fish and must and are being given this form of recreation. Fortunately for the Commission, many of these anglers are not so discriminating and are satisfied to angle for many of the kinds of fish that are looked upon with disdain by those who prefer trout or bass.

Studies have been made of all suitable waters in these thickly populated districts and many areas are being regularly stocked with fish of takeable size, such as bream, catfish, yellow perch, and carp.

While the growing of bream, catfish, and yellow perch is not as technical a task as that of producing the annual crop of trout and bass, yet problems have arisen which were not anticipated when the program was inaugurated. When these species are held in great numbers at the hatcheries for the length of time required, disease control and diet problems enter the picture. Besides this, the stocking of larger fish requires an extra amount of space and a vast amount of food. There is an increase in



Newly Completed Eight-Acre Bass Brood Pond at Corry Hatchery

labor costs in caring for the fish and an increase in transportation cost when planting the fish. But it is generally agreed by all those who have given the program careful study that the cost is commensurate with the results obtained.

#### **SPRING AND OPEN SEASON STOCKING**

More trout were planted in the spring of the year for the 1941 trout fishing season than ever before, and it is the intent of the Board to gradually increase the spring and mid-season stocking until eventually comparatively few trout will be stocked in the fall of the year. This change-over is being made as hatchery conditions can be adjusted to

care for the fish. This involves the holding of from 75 to 100 tons of fish five to six months longer than was done in the past, and this program is to be carried out without a major reduction in the annual yield. The spring and open season planting is becoming necessary chiefly because of the frequent drought periods. From the middle of July to the following February it is not uncommon for many of the major trout streams to become reduced 85% in surface water acres, and in some cases to entirely cease to flow. Even a number of the famous limestone streams fall 50% in surface area during these periods. The periodic drying up of many of the tributary streams and the diminished flow in the major streams have destroyed much of the natural trout food. In many cases the larger trout streams do not now contain more than 10 to 15 pounds



Warm Water Fish—Ponds Under Construction at Corry

of bottom organisms per acre (dry weight). It is estimated that it requires from five to seven pounds of this kind of food to support a pound of trout for twelve months. Consequently, in the average stream there is only enough food to support a very few pounds of fish for any length of time. During drought periods the fish must collect in the deeper pools in order to survive. Under these conditions the loss is very heavy due to cannibalism and destruction from predatory animals. Severe winter weather also takes its toll, as streams with a small water flowage freeze solid for short periods.

#### THE PYMATUNING SANCTUARY

The Pymatuning Reservoir located in Crawford County, Pennsylvania, and Ashtabula County, Ohio, is composed of two separate dams, the main section comprising 12,000 water acres, and a smaller reservoir

comprising 2,500 water acres. This smaller dam located near Linesville, Crawford County, is known as the Pymatuning Sanctuary and the dam and surrounding land were set aside as a wild life refuge.

In 1934 it was stocked with large-mouthed bass, pike perch, yellow perch, bream, catfish, and golden shiner minnows. Stocking was continued until the fall of 1937. Carp, suckers, and possibly some game fish were in the slack water section when the area was flooded. Newly flooded areas such as the Sanctuary are generally very productive in fish life. This area was exceptionally so, and by the spring of 1939 it had apparently reached its biological capacity or limit, and it was thought advisable to remove some of the fish and stock them in public waters.

Where a body of water is inhabited by fish and the yield is not utilized, it soon reaches a saturation point or biological limit; and unless



Nursery Pools Under Construction at Pleasant Gap Unit, Bellefonte Hatchery

the yield is utilized in some manner, the area will be depopulated by disease or in time result in a crop of undersized or runt fish.

When the field crew was detailed to remove some of the fish no definite plan for the future use of the reservoir was given consideration. The thought was to remove a certain number of fish to temporarily relieve the crowded condition. As the fish removal program progressed and those in charge became more familiar with conditions, a plan for the permanent use of the site for fish production was inaugurated. The 2,500 acres were to be used as a natural fish farm. In time it will be known approximately what the yield is in pounds per acre of each species and this yield will be removed and stocked in public waters. In addition

to the annual removal of adult fish, eggs of some species and the fry of others will be collected and taken to the hatcheries to be grown to a suitable size for stocking.

In order to derive the utmost in fish production, the following program is now being developed. Dykes are being constructed across several natural bays adjacent to the proposed hatchery building and these areas are being subdivided into ponds. Four, covering approximately three acres, have been completed, and twelve additional ones are under construction. The water in the ponds will normally remain at the level of the water in the lake. To prevent stagnation, a circulation will be



Daphnia Beds Under Construction at the Pleasant Gap Unit of the  
Bellefonte Hatchery

created by pumping water directly from the main reservoir, passing it over aerating devices, and permitting it to flow from this point through the ponds by gravity.

These ponds are to be used for a number of purposes. In the very early spring, as soon as the ice leaves the main lake and netting operations can begin, such adult fish as the pike perch, suckers, and yellow perch will be confined in these ponds. The eggs will be taken from these species and sent to other fish farms to be hatched. After this egg yield has been taken, a certain number of the parent fish will be distributed in approved stocking waters and the balance returned to the lake.

From the results obtained in the spring of 1940 and the spring of 1941 with temporary holding pens, it appears that when the ponds are in operation the egg crop should be sufficient to take care of the hatcheries in the central and western parts of the State.

Immediately following this operation, the pools will be filled with brood bass and catfish. After these species spawn in their natural way,

**COMMONWEALTH OF PENNSYLVANIA  
BOARD OF FISH COMMISSIONERS**

**C. A. FRENCH, Commissioner of Fisheries**

**C. R. Buller, Chief Fish Culturist**

**MEMBERS—Board of Fish Commissioners**

C. A. French, *Chairman*

Edgar W. Nicholson, Philadelphia

M. L. Peek, Radnor

Harry E. Weber, Philipsburg

J. Fred McKean, New Kensington

H. R. Stackhouse, *Secretary to Board*

**SUPERINTENDENTS OF HATCHERIES**

Wayne County Hatchery No. 1—J. L. Zettle, Superintendent, Pleasant Mount.

Erie Hatchery No. 2—P. H. Hartman, Erie, Erie County.

Corry Hatchery No. 3—A. G. Buller, Corry, Erie County.

Bellefonte and Spring Creek Hatchery No. 4—Dewey Sorenson, Bellefonte, Centre County.

Torresdale Hatchery No. 5—John Wopart, Holmesburg, Philadelphia County.

Union City Hatchery No. 6—A. G. Buller, Union City, Erie County.

Reynoldsdale Hatchery No. 7—T. R. Sorenson, Reynoldsdale, Bedford County.

Tionesta Hatchery No. 8—Bernard Gill, Tionesta, Forest County.

Huntsdale Hatchery No. 9—T. J. Dingle, Huntsdale, Cumberland County.

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Daphnia Beds Under Construction at the Pleasant Gap Unit of the Bellefonte Hatchery

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C. A. FRENCH  
Commissioner of Fisheries

**EDGAR A. GUEST**  
**The Poet of the People**

**FISHING SCHOOL**

(An eastern college announces a course in fishing)

Not out of books  
In musty nooks  
By study and reciting  
Can a youngster learn  
To what flies to turn  
When the Maytime trout are biting;

Not in the gloom  
Of a stifling room  
With scarcely an hour of sunning  
Can a lad be shown  
How baits are thrown  
When the pickerel are running.

Oh, never that way  
For monthly pay  
Can you teach how lines are baited,  
For by love alone  
Are fisher-boys grown  
And properly educated.

Some man must take  
To stream or lake  
The boy that has started wishing  
For the thrills divine  
Linked to rod and line  
And teach him the art of fishing.

(Reprinted by courtesy of The George Matthew Adams Service)

**LETTER OF TRANSMITTAL**

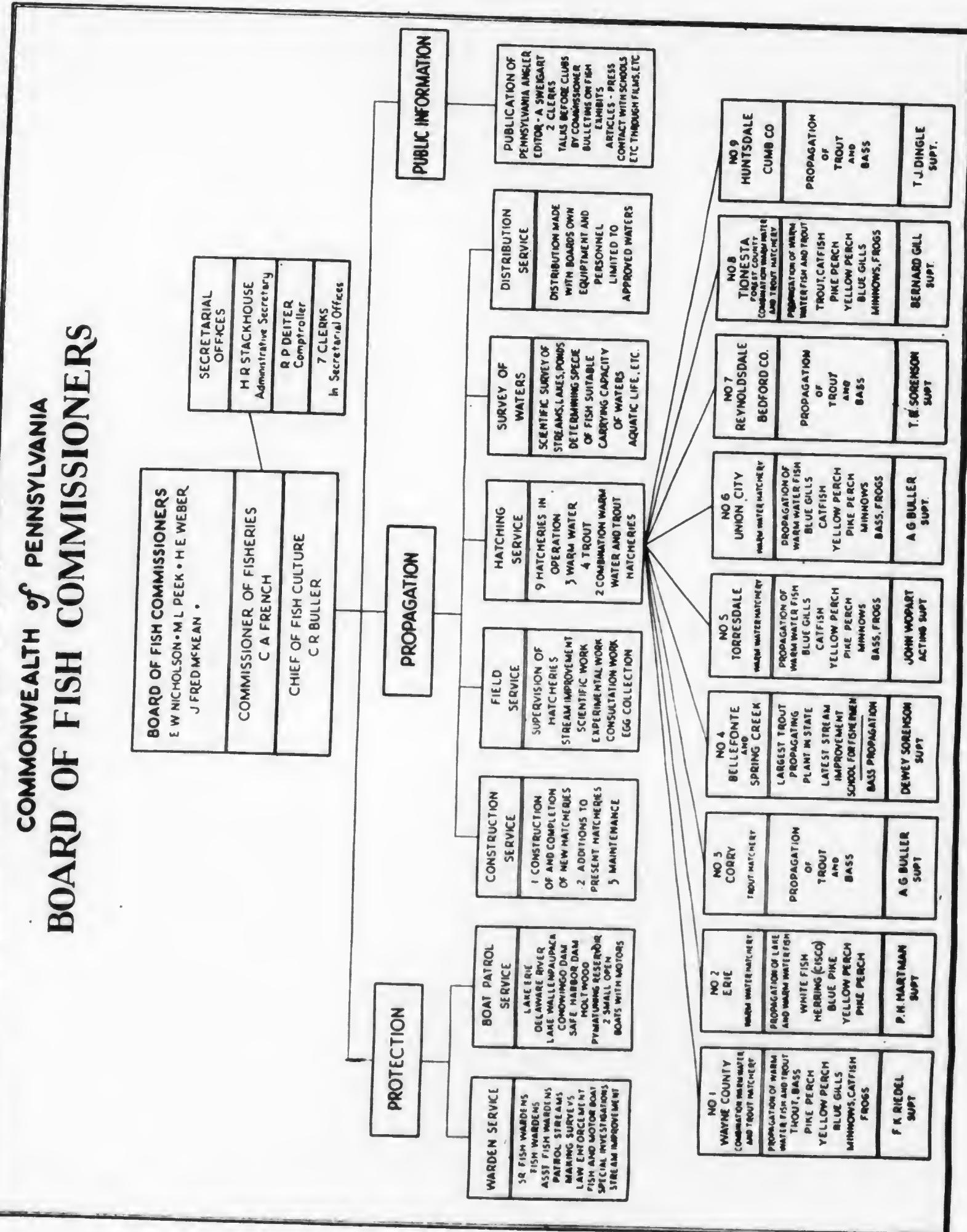
His Excellency Governor Arthur H. James,  
Harrisburg, Pennsylvania.

Sir :

Conforming to provisions of article V, section 504, of the Administrative Code, we present herewith Biennial Report of Operations of the Board of Fish Commissioners for the period ending May 31, 1940. Some of the statistical data has been compiled for the calendar year 1940 so those who fish in Pennsylvania will have a complete picture of present day activities.

Respectfully,

BOARD OF FISH COMMISSIONERS  
C. A. French, Commissioner of Fisheries,  
E. W. Nicholson,  
M. L. Peek,  
H. E. Weber,  
J. Fred McKean.



#### TO THE FISHERMEN:

We are pleased to report that the last two years have shown more real progress than in any previous biennium. With the program as outlined the ensuing two years should show even greater advancement. This statement is based on the following:

1. Production of large size fish will be greatly increased, including sunfish, catfish and yellow perch, the majority of which have previously been distributed in the fry stage.
2. The results of line breeding will be coming into their own and there should be a very promising report during the next two years.
3. The scientific laboratory which is used for research, etc., is now in full operation and the Board will be in a position to check and carry on the various experiments which are so necessary in a program such as set up by Pennsylvania.
4. The transportation and rearing problem will be practically solved with the result that fish can be reared and transported to the streams and waters at a great reduction in the former costs for this function.
5. The development of the Pymatuning Sanctuary should be well under way in the next biennium, and in our opinion it will be the largest natural fish hatchery in the world, supplying more warm water species than all other hatcheries combined.

#### JUNIOR CONSERVATIONISTS

In previous reports we have stressed the point that the fishing of the future rests with the youth of Pennsylvania. It is pleasing to report that a large number of sportsmen's groups in various parts of the Commonwealth have organized Junior Conservation Groups, and they are already doing a grand job. Practically all groups have set up certain standards for the awarding of merit badges, which provide that those qualifying must know the principal natural resources of their locality—the principal fish, birds and animals—their seasons and how protected, present evidence of direct assistance in conservation projects, such as fighting forest fires—help in checking erosion, building shelters, planting trees, etc. A supporting program such as this will bear real fruit in the future.

We wish to thank you for the fine cooperation you have given the Board.

Commissioner of Fisheries.

**REPORT OF THE BOARD OF FISH COMMISSIONERS  
FOR THE PERIOD ENDING MAY 31, 1940.**

**ACCOMPLISHMENTS**

**C. A. FRENCH, Commissioner of Fisheries**

**CHANGED FISH CULTURE METHODS**

During 1940 radical changes were made from the old system of propagating catfish, sunfish, yellow perch, and bass. Under the new system, the raising of these fish is being done in narrow troughs in our hatching buildings, also baskets which are placed in various lakes and ponds under the control of the Board. This method has revolutionized this work, and we will now be able to raise great numbers of these fish in a very limited space. The beginning of this new cultural work was one of the most outstanding accomplishments of 1940.

**LINE BREEDING**

For three years we have made a study of line breeding of fish, and as far as we know this has never been attempted anywhere. Line breeding has been successful in many other fields such as cattle, horses, flowers, fruit, etc., and we see no reason why it cannot be done with fish. A long range program has been set up and at the present time the initial fish to be used in this experiment have already been hatched at Bellefonte, and while it will take a number of years to develop the strain of fish, we believe we will eventually be able to produce an average ten to twelve inch trout in a year instead of the average six inch fish which we raise at the present time.

**BASS STOCKING IN LAKES**

For the first time we will stock bass in the lakes of this state. A survey over a two year period has shown the type of fish inhabiting these bodies of water and has proven to the Board that lakes having an area of forty acres or more which are open to the public for fishing and now contain bass should be included in this program starting with 1941.

**TANK TRUCKS**

The tank trucks in operation during the last few years have proved such a tremendous success that the Board has constructed an additional eleven (11) which are now in use. In comparison, it is well to state that in 1936 when pails and cans were in use, the Board stocked approximately 129 tons of fish, requiring a truck mileage of 456,461 miles, while in 1939 there were approximately 305 tons planted, with a truck mileage of only 386,160 miles.

### **REFRIGERATION VAN TYPE TRUCK**

This truck is capable of carrying ten tons of fish food, delivering it at the hatcheries in much better condition than previously, as the truck is insulated. It was put in operation in 1939 and has saved the Board a considerable amount of mileage, as one trip with this truck will be equal to two trips of the old style. During 1939, 1,069 tons of various kinds of feed were fed at the hatcheries—this item is increasing yearly.

### **UNIFORMS FOR ENFORCEMENT OFFICERS**

Every regular warden has been supplied with two uniforms, and in our opinion their appearance will equal that of any other conservation group in the country. They are also being furnished with other necessary equipment.

### **RESEARCH**

Our outdoor research laboratory is almost completed and will be ready to be put in operation this year. At this plant we expect to experiment with raising of crayfish, many species of minnows, and various kinds of aquatic life, with the thought of eventually stocking not only fish but food for them ~~to~~ live on.

### **REFRIGERATION BUILDINGS**

In 1940 two modern refrigeration buildings, located at Bellefonte and Huntsdale, were constructed and put into use. They have a maximum storage capacity of ninety tons, and will mean an annual saving of approximately 35,000 miles in truckage.

### **PYMATUNING SANCTUARY**

Development of a natural fish hatchery has already been started in the refuge area of Pymatuning Reservoir. This will be the largest natural hatchery of its kind, and from data acquired over the past two years, we believe it will be possible to harvest a crop of fish which will exceed the output of any of our hatcheries. This development will not interfere in any way with its original purpose as a wild life sanctuary.

### **ACQUISITION OF RESERVOIRS**

Through the kindness of several water companies, we have been granted permission to use their lakes as fish nurseries. Several large areas have been turned over to the Fish Commission to use in this capacity, and we will harvest a crop of fish from them without involving any expense other than actually gathering the fish. We feel this is a very important step forward and shows a real spirit of cooperation on the part of the water companies.

### **UNIFORM REGULATIONS**

For many years fishermen have requested a uniform set of regulations for the entire state. The first step in this direction was taken this year when the Lake Erie regulations were made to more nearly conform with the inland waters. However, the season on Lake Erie remains as

the fry of the bass will be removed, a portion will be grown in the tanks and wire fish nursery batteries at this site, and the balance sent to other plants. The parents will be replaced in the lake. The entire crop of baby catfish will be handled at the fish farms in the western part of the State, and the adults sent out for stocking purposes. When the fall removal of adult fish takes place from the main lake, these pools will then be used as holding areas.

The plans for the main building call for a two and a half story combination hatchery building and garage, to be constructed of random ashlar sandstone. The first floor will be a tank room for the handling and growing of fish, the second floor will be a garage and workshop, and the third floor will be used as storage space for nets and equipment. A novel feature incorporated in the plan is a boat slip which extends into the tank room where the newly designed live fish car can be floated. The



Newly Constructed Rearing Pool at Huntsdale

live fish car is a device used to boat the live fish as they are taken from the nets to the boat landing. When this car enters the slip in the building, an electric crane will lift the transferable tanks full of fish and convey them to a connection of running water. The load of fish can then be sorted and graded without delaying the car and without danger of loss of fish.

In farming this 2,500 acres of water, the following schedules of operation are to be carried out each year. In the early spring as soon as the ice disappears, netting operations will begin. The fish run will consist largely of suckers, pike perch, and yellow perch. The eggs of these species will be collected and a portion of the adult yellow perch will be used for stocking purposes. The balance as well as all the pike perch and suckers will be released in the lake, for the present time at

least. This is thought advisable until the number of brood pike and bass increases. After this run of fish is over for the season, netting operations will continue for catfish and bream until the water temperature becomes too high for this work. All the catfish and bream will be used in the distribution program. The close of this operation will be at the time when the bass and catfish have spawned and the young are of a size that can be lifted and transferred to the nursery areas. In addition to using the artificial pools as brood areas, natural spawning grounds in the open lake have been staked off and the fry will be taken from these places. This work will continue until about July first. At that time the small bream will have developed sufficiently to be lifted and placed in pools to grow. The bream collection will continue until about the first of August. By the early part of September or as soon there-



Daphnia Beds Under Construction at the Huntsdale Hatchery

after as the water temperature becomes low enough for this kind of work, the fall trap net work will start. This work will continue until the lake freezes over. All yellow perch, bream, and catfish taken at this season of the year will be stocked in fishing waters.

Most of the people of the State are familiar with the way the carp gather in the causeway connecting the main reservoir with the sanctuary, as this curiosity has been given much publicity in the press and on the screen. Thousands of tourists visit the site annually. In the main reservoir, the carp have become so abundant that it is necessary for the well-being of all the fish to remove a portion of them. Annually the Board captures about twenty tons and stocks them in the metropolitan districts for the pleasure of those who enjoy fishing for carp. These fish have become so popular in the places they are planted, and the demand has

become so great for their planting in similar areas, that in order to conserve and assure a continuous supply, the number that was formerly allotted each district had to be materially reduced.

The farming of the Pymatuning Sanctuary is an important part of the Board of Fish Commissioners' fisheries program for the following reasons:

- (1) Each year it is producing a number of tons of large fish for stocking purposes at little cost.
- (2) The Board would not be in a position to conduct a state-wide stocking program of takeable catfish, bream, and other fish if the numbers grown at the other fish farms could not be supplemented from this source.
- (3) The collection of small bass, bream, and catfish from the sanctuary greatly reduces the number of brood fish that were formerly



Hatchery Building and Pools at the Pleasant Mount Hatchery

retained at the other plants; and the ponds which were formerly used for this purpose are now used to hold and grow more pounds of fish for distribution.

- (4) Indications are that in a few years the sanctuary will supply the majority of the pike perch egg requirements. Heretofore, there was no place in Pennsylvania where the eggs could be collected and it was necessary to acquire them from outside sources.
- (5) Suckers are planted in a number of waters of the State. Last spring the sanctuary produced a number of the sucker eggs, and it appears that when the holding spaces are available, the number of eggs taken will fulfill the needs of the western plants.

- (6) It is now supplying and should continue to supply the yellow perch egg crop for the western part of the State.
- (7) It supplies the carp that furnish fishing in the many water areas that would not be suitable for the more gamey varieties.

#### NEW METHODS OF REARING FISH

A few years ago it was generally acknowledged by fish culturists that large ponds of an acre or more were necessary for the growing of black bass. This was thought to be largely due to the lack of knowledge of how to provide food for the fish. Later as daphnia culture became more perfected and knowledge was acquired as to how to feed artificial food, the larger ponds were abandoned for smaller units. The chief advantages of the smaller ponds as compared with the larger ones are: (1) Fry of more uniform age could be more easily kept separated. (2) A more uniform growth could be effected as a larger percent of the fish could be taught to take artificial food. (3) When disease broke out, the smaller pools could be segregated with less danger of the disease spreading over the entire area.

The use of smaller ponds led to the eventual use of still smaller units, until at present bass, bream, catfish, and other species, are being very successfully grown in small units where the fish are under the constant observation of the attendants. These small units consist of the conventional indoor holding tanks, portable metal tanks that can be installed out of doors at any location where a suitable supply of water is available, and wire nursery batteries installed out of doors in ponds. The chief advantages of this new departure in fish culture practices are: (1) Reduction in loss through cannibalism as fish are easily kept graded for size. (2) More frequent cleanings are easily accomplished which make the smaller units more sanitary. (3) The danger of loss through disease is greatly reduced because of better sanitation. The ability to observe the fish lessens danger of epidemics and when diseases are observed, better control methods can be practiced. (4) Labor costs are reduced. (5) Both food and space are conserved. Ponds which were formerly used for holding bass fry are now being used to grow older fish to a more mature age.

#### DAPHNIA CULTURE

The old type wooden or earthen daphnia beds are being replaced with ones constructed of concrete. Beds of this type have been built and are in use at Bellefonte and Huntsdale, and others are under construction at Pleasant Mount and Union City. It has been found that the concrete beds are superior to those formerly used as they are more productive, less costly to operate and maintain, and can be used for other purposes when not needed for the growing of daphnia.

#### USE OF MUNICIPAL RESERVOIRS

Throughout the State there are many thousands of acres of water impounded for municipal purposes. Most of these water areas contain fish of different kinds, but are not open to the public for fishing. This

results in the loss of the annual fish yield in these reservoirs. Officials of the Philadelphia Suburban Water Company and the West Chester Water Company made a study of the fish yield in their water holdings. They expressed a desire to have the general public derive some benefit from the annual crop, but realized that for sanitary reasons the reservoirs could not be opened to the public for fishing. After several conferences with officials of the Board of Fish Commissioners, it was agreed to permit the Board to use the areas as fish nurseries, where the annual crop of fish could be removed and used to stock public fishing waters. The reservoirs are near the Torresdale Fish Farm and are now being used as part of that plant.



The Reynoldsdale Hatchery

#### FISHERIES INVESTIGATIONS

During the biennium, biological investigations have been continued on the streams and lakes. Notes were compiled on approximately two hundred separate water areas.

Wardens and other field representatives are collecting scales from fish caught by the anglers and acquired from other sources. These scales are sent to the laboratory for age determination. The intent of the program is to eventually acquire a better knowledge of the average rate growth of different kinds of fish in the State.

All of the approved stocking waters have been measured and the areas converted into acres. This was done to assist in working out the fish distribution program.

#### CONSTRUCTION

During the past biennium, major construction programs have been carried out at a number of the plants. A portion of the work consisted

of entirely new construction and part involved the reconstruction of ponds to meet present day fish cultural needs.

BELLEFONTE—A cold storage building for fish food was completed. This building, having a capacity to store from 70 to 80 tons of food, is equipped with modern food preparation and automatic ice making machinery.

The electric power line was extended from lower Spring Creek Project to the upper Spring Creek Project.

Flood dykes were built along the west side of the stream at the Spring Creek Project.

Three of the old wooden conversion dams at Spring Creek were replaced with concrete ones.



Hatchery Building, Union City

Twenty-seven new ponds were completed and put in use at the Pleasant Gap Unit, and one concrete daphnia bed consisting of twenty-five units was completed and put in use.

HUNTSDALE—Constructed a cold storage plant very similar to the one built at the Bellefonte plant.

Forty-one nursery and rearing ponds and a concrete daphnia bed of thirty-two units were constructed.

The superintendent's dwelling was remodeled.

The channel of Yellow Breeches Creek was changed.

An electric distribution system to provide outside lighting for the ponds was constructed.

REYNOLDSDALE—The pipe line extending from spring to hatching building was replaced.

UNION CITY—One seventeen unit concrete daphnia bed was constructed at this hatchery.

CORRY—Four additional ponds have been completed and are now in production. These pools are located at the extreme lower end of the main plant and will be used for warm water fish during the summer and for the holding of trout during the winter. A series of ponds are under construction at the annex, consisting of four nursery pools and one eight acre brood pond. It is expected to have this area in production by the spring of 1942.

PYMATUNING—Nine earthen nursery pools were constructed. An electric water distribution system was installed.

PLEASANT MOUNT—The bulkheads in Miller Pond and White Oak Pond were rebuilt and catch basins were constructed.

Seven bulkheads in the hatchery brood ponds were reconstructed and three ponds were subdivided.

One concrete daphnia area of twenty-nine units was constructed. Concrete ponds in aquaduct series were repaired.



Brook Trout in the Act of Spawning—Position of Male and Female During the Actual Spawning



Brook Trout in the Act of Spawning—Another Position of the Female While Excavating the Nest



Brook Trout in the Act of Spawning—Another Position of the Female Excavating the Nest



Brook Trout in the Act of Spawning—The Female Is in the Act of Covering the Newly Deposited Eggs With Gravel



Brook Trout in the Act of Spawning—Position of Male and Female During the Actual Spawning



Brook Trout in the Act of Spawning—Another Position of the Female While Excavating the Nest



Brook Trout in the Act of Spawning—Another Position of the Female Excavating the Nest



Brook Trout in the Act of Spawning—The Female Is in the Act of Covering the Newly Deposited Eggs With Gravel



Wire Fish Nursery Batteries in Use at Pleasant Mount

### CONTROLLED BASS CULTURE

Intense investigation and study of bass culture has been taking place in Pennsylvania in the past few years. This work is revolutionizing the growing of bass and also bringing to light a number of new methods that can and are being applied to the culture of other pond fishes.

When bass-growing was first seriously undertaken, it was generally acknowledged that the fish could not be grown except in large ponds of an acre or more, and hatcheries were built according to this idea; the large pond was necessary because of the opinion that small bass could not be induced to take artificial food and because little was known about the culture of the daphnia—the organism that is very vital as food for the very young fish. The number of bass fry that could be placed in a given area was dependent upon the amount of daphnia that nature would produce in the ponds, and as the fish passed beyond this feeding, they were supplied with live minnows—produced directly in the bass fry pond or hatched in separate pools and transferred to these areas. This was more or less a duplication of nature's method, and usually resulted in a very small yield because the result was dependent upon many things that could not be controlled by those in charge.

Later, knowledge was gained on how to grow daphnia in huge quantities, and it was also found that bass could be induced to take other than live food. These advancements showed large pools were not suitable for growing the bass by this method and resulted in the redesigning or new construction of smaller pools.

The artificial culture of daphnia, the feeding of artificial food to the small bass, and the use of smaller ponds for the baby fish, were the first major steps forward in this work. The advantages of the smaller pools over the larger ones were: (1) Bass of different hatching periods could be more easily kept separated. (2) Pools could be more thoroughly cleaned and sterilized. (3) A larger percent of the bass could be induced to take artificial food, resulting in a more uniform growth, which tends to somewhat reduce cannibalism.

While the smaller pool had these and other advantages over the larger ones, it still left much of the results to factors that could not be entirely controlled. The use of the smaller areas led to the thought that the closer the bass could be kept under control during their first growing period, the better the outcome would be, and this terminated in experiments with the use of tanks and screened floating boxes for this work. The results have been so satisfactory that this year the Board has in operation at the different plants 185 tanks and 200 boxes, with 100 additional tanks under construction for next year's use.

Briefly this system appears to have the following advantages over the pond culture:

Reduces labor costs—one attendant can care for and feed more bass in the confined areas than is generally the case in the pools.

Better sanitation, as the tanks and boxes can be cleaned daily.

Absolute control over predators such as water beetles, water tigers, etc.

Control over cannibalism, as the fish can be sorted at frequent intervals.



Portable Metal Tanks in Use at the Pleasant Mount Hatchery for Bass Culture

Better observation and control over fish parasites or diseases.

It is also the opinion of your Board that much more satisfactory results will be had when bass are stocked of a much larger size than are being planted at the present time. From the studies made in this work in the past several years, it is thought that this will be a reality in the not too-distant future. When this is brought about pools that formerly were used to hold the bass through their first growing period will be utilized for the growing of the bass through their second growth period, and tanks or boxes will take the place of the pools now in use for the baby fish, thus bringing about this change without the necessity of building additional pools for this purpose.

## LEGISLATION

The only new legislation since the last Biennial Report is as follows, most of which was recommended by the Pennsylvania State Federation of Sportsmen at the Annual Meetings:

### LEGISLATION ENACTED, 1939 SESSION SENATE BILLS

No. 160 (Act No. 364)

Provides for the taking of rock bass at any time of the year and removes size limit on rock bass, in the inland waters; amends the inland waters fish laws to conform with resolution of the Board reducing the daily creel limit on certain species of fish, bait-fish and fish-bait; provides for the issuing of new licenses and buttons (resident and non-resident) for fifty (50) cents and upon affidavit in case both license and button are lost or destroyed; provides that an additional penalty of ten (10) dollars may be imposed for each fish caught or had in possession contrary to the rules and regulations of the Board; provides authority for the Board to close streams and other waters as nursery waters for such periods of time and under such methods of advertising as the Board may prescribe; provides for the taking of bait-fish and fish-bait on Sunday and provides the Board authority to acquire title to or control of land or buildings or fishing rights or other rights on land suitable for the protection, propagation and management of fish life or for public fishing or administrative purposes, etc, by purchase, gift, lease, or otherwise.

No. 982 (Act No. 363)

Provides that it shall be unlawful for any person to make, sell or have in possession a net larger than four (4) feet square or four (4) feet in diameter without a permit therefor issued by the Board and providing a penalty for violation of not less than one hundred (100) dollars nor more than two hundred (200) dollars and imprisonment for a term of thirty (30) days.

There has been much discussion throughout the State requesting a shorter season on trout, elimination of the fish basket or eel rack, prohibiting night fishing, etc., but any legislation of this character would have to be approved by the Federation of Sportsmen's Clubs before being presented to the Legislature.

In so far as eel rack permits are concerned, they only average about 200 in the inland waters and 15 in the upper section of the Delaware River. Those waters in which they can be used in the inland area are:—the Susquehanna River below the boundary line of the city of Pittston and the Duryea borough line on the north branch; below the bridge at the Northumberland-Lycoming County line on the west branch; in the Juniata River below Mount Union. The permits are issued in the Upper Delaware only because the State of New York permits the same device to be used by their residents and Pennsylvania believes that those who live on our side of the river should have the same privilege. Repeated efforts have been made to have the law amended but up to this time with no results.

The following statement will show the number of eels taken in the Delaware River and the inland waters during 1939 and 1940 together with the estimated value:

	1939	1940		
	No. of lbs.	Value	No. of lbs.	Value
Delaware River .....	10,890	\$1,242.00	8,520	\$989.00
Inland Waters .....	27,663	4,101.24	29,961	4,273.73

It certainly doesn't look like a paying proposition, and if they were eliminated, it would aid greatly in the enforcement of the Fish Laws in these areas and at the same time eliminate many bitter differences among the operators themselves.

#### PYMATUNING LAKE

The new regulations as set up by the State of Ohio and the Pennsylvania Commission governing fishing in the Pymatuning Lake have met with general approval, and it is hoped that within the next year or two these regulations will be made to conform more closely to the laws governing fishing in the inland waters.

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#### ENFORCEMENT

One of the most important functions of the Board is that of protection. This can only be done by efficient officers, and Pennsylvania believes it has just that.

Before becoming a regular officer capable of enforcing the provisions of the Fish Code, it is necessary for the applicant to pass a strenuous course of training in addition to which he is part of a selective service. By that we mean the man is first selected for his general appearance, physique, mental alertness, manner of speech, and his ability to make a fair rating in the general examination. Upon being accepted he is assigned to one of the hatcheries for a period of from six to eight weeks where he is subjected to manual labor and all phases of the work necessary in the hatching, propagation and distribution of fish.



Upon the completion of this course he is then assigned to duty in the field, with the understanding that he will continue his training at the Officers' Training School which is held each year at the Spring Creek Project.

This school has been most popular and the regular curriculum includes instruction in self-defense by officers of the State Police—lectures on law enforcement—proper procedure in prosecutions—round table discussions on problems in various sections—control of stocking—special instructions for management of Deputy Fish Wardens who are assigned to their districts.

The school is also attended by members of the Board who instruct the men on questions which are constantly coming before the Board and which in most instances can be cleared up by the men in the field, etc.

During the years the school has been in operation, a tremendous improvement has been shown in the efficiency of all officers. The training has given both a physical and mental development which commands more wholesome respect for observance of the law in their respective communities, and above all, has taught them their serious responsibilities and obligations to the fishermen of the Commonwealth.

If, after completing the course, the new applicant still desires to become a regular officer, the Board feels that with good judgment he has all the qualifications necessary and he is put on his own. It is pleasing to know that at least ninety-eight percent of those selected develop into excellent enforcement officers.

A statement of the number of arrests during the last biennium will be found in the statistical data. The last few years have shown that it is not always the number of arrests a man makes, it is the fact that he is respected in his community and has made it a better place to live in that counts. True, you will always have the violator, but we have found that the present day picture is much different from that of ten years ago, which of course has been due in a large way to the great number of organized sportsmen's groups and the excellent work they have done among the Junior Conservationists.

Let us hope that the future will mean an easier job for the officer so that he can devote more of his time to education and by training the younger groups, create a respect for the laws which will eventually result in making all those who fish and hunt in the community, and who are stockholders in the Commission, self-appointed wardens. In this way the future will indeed be preserved. Let's all pull together and do what we can to bring this about.

The accompanying photograph will be of much interest to fishermen. We hope that you will be proud that our Regular Officers are now equipped with full uniforms. In our opinion their appearance will equal that of any other conservation group in the country, and many favorable comments have been received from all sections of the Commonwealth.

## ACQUISITION OF PUBLIC WATER SUPPLIES AS FISH PROPAGATING AREAS

For many years the Board of Fish Commissioners has endeavored to secure for the fishermen of Pennsylvania, the right to fish in public water supplies. Where this could not be accomplished, an effort was made to acquire the water area for propagation purposes. Unfortunately, no progress was made until April of this year, and the first agreement of this kind was entered into with the Philadelphia Suburban Water Company, Bryn Mawr, turning over what is known as their Springfield Reservoir on Crum Creek, Delaware County.

The water area is approximately 400 acres and will be used as a co-operative nursery, which will in no way interfere with the operation of the Reservoir as a water supply. Under the plan which has been formulated, it will be possible to greatly increase the distribution of bass, sunfish, catfish and suckers.

After a careful biological study which is already in progress, it will be possible for the Board to annually remove the surplus small fish, take them to the different State Hatcheries where they will be grown to a size suitable for stocking in the public waters. The surplus mature fish will be planted direct from the Reservoir into suitable fishing areas where the public is allowed to fish.

While the Reservoir will be posted as a nursery and all fishing prohibited on the main body of water, the agreements which have been previously set up will still be in force; that is, the public may enjoy fishing in that part of the Reservoir from the bridges and highway embankments carrying the Gradyville Road and the Bishop Hollow Road across the Reservoir.

Agreement has also been consummated between the Board of Fish Commissioners and the Borough of West Chester.

The Board hopes that other water companies in Pennsylvania will follow their example inasmuch as the fish crops in most of these reservoirs could be harvested through an agreement with the State Fish Commission. It would be a direct benefit to the anglers and would greatly increase the distribution and, still more important, would be conserving a natural resource which is now going to waste.

## PYMATUNING SANCTUARY

On June 1, 1940, an agreement was signed by the Department of Forests and Waters, the Game Commission, and the Board of Fish Commissioners enabling the Board to establish a Fish Farm in the refuge area of the Pymatuning Reservoir.

In the construction of Pymatuning Reservoir, Crawford County, comprising approximately 18,000 acres, a game and fish sanctuary of 3,700 acres was created on the upper dam and adjacent land, 2,500 acres of which are now covered with water. For the past two years we have made extensive biological surveys of this area and as a result, it was found the sanctuary had reached a point in fish production where a



**Proposed Site of Hatching Building at Pymatuning Sanctuary**

certain amount would have to be removed annually to prevent loss. These fish are to be used in stocking the main body of the lake, the surplus to be distributed to the inland waters open to the public for fishing. This year's crop has already reached approximately 400,000 fish of the different warm water species, and up to this time 30 tons of adult fish have been made available for stocking. In addition, 25 bushels of yellow perch eggs were taken to the various hatcheries where they were hatched and distributed.

From all indications, it appears the sanctuary each year will produce sufficient pike and yellow perch eggs for all inland waters, and will also be a source of supply for sucker eggs. There will also be produced sufficient bass for the rearing ponds at several of the Board's Hatcheries, and in addition a sufficient number will be propagated at the sanctuary for distribution in the main body of the lake. This will also apply to bream, catfish and minnows.

Plans are now completed for the construction of a two-story building which will contain a series of tanks for the sorting and handling of fish and the growing of bass fry to the fingerling stage. A number of pools will also be constructed for holding areas and the growing of daphnia.

The primary purpose of this new Fish Farm is to keep the fish population under control, and at the same time the surplus removed will add greatly to our distribution of warm water fish.

## **ALLEGHENY NATIONAL FOREST—A PENNSYLVANIA WILDLIFE**

### **ASSET**

This 726,000 acre tract in northwestern Pennsylvania is now more than 63% in government ownership, not counting the two large areas of Pennsylvania Game Lands within its borders. Under the jurisdiction of the Forest Service of the United States Department of Agriculture, these lands are being managed for the public good. Its policy of multiple use management attaches great importance to fish and game as a forest resource.

Besides the Forest Supervisor and his staff at Warren, Pennsylvania, there are district forest rangers and assistants stationed at Marienville and Sheffield, Pennsylvania. These forest officers direct fire control activities, prepare and execute timber management plans, make timber sales, participate in wildlife management, construct and maintain all manner of improvements, and attend to the many administrative details that the management of nearly one-half million acres demands.

### **COOPERATION**

A memorandum of understanding has been drawn up between the Pennsylvania Board of Fish Commissioners and the U. S. Forest Service, which serves as a basis for close cooperation in dealing with fish and stream work. State regulations governing the taking and protection of fish apply on Allegheny National Forest the same as elsewhere in the State.

### **SURVEYS**

Nearly 500 miles of fishing streams are located within Allegheny National Forest. All of the streams have been visited and surveyed by a fisheries technician and a long-range plan for their improvement has been prepared. This plan specifies the desirable stocking of the correct species and number of fish in each stream as well as the physical improvements needed to improve habitat.

### **PLANS**

All of the fish placed in the forest streams are allocated according to the approved cooperative stocking plan. A plan of action based upon actual field conditions was the first fruit of cooperative work between the federal and state agencies. Since a good plan should be the basis of any endeavor, it follows that a good start toward better fishing conditions has been made.

### **FISH STOCKING**

The stocking plan calls for both fingerling and legal size fish. Under present arrangements fingerlings are furnished by the Fish and Wildlife Service of the U. S. Department of Interior. The Pennsylvania Fish Commission furnishes the legal size fish.

## STREAM IMPROVEMENT

Log structures designed to improve stream conditions were first placed in the streams in 1935. These have been added to and maintained by the CCC camps until there are now 206 structures in 23 miles of good trout water. Many additional structures will be built as funds and manpower become available.

Many different types of structures were experimented with under the supervision of a fisheries expert. Study of costs and results has enabled the Forest Service to standardize its stream improvement structures. This has resulted in greatly reduced costs, longer life and less maintenance.

## FARNSWORTH TROUT REARING STATION

Because of the remoteness of existing federal facilities for rearing trout, a plan was devised in 1938 whereby WPA and CCC, under the direction of the Forest Service, would build a trout rearing station on the Forest. Farnsworth Creek was selected as the most suitable location. The most up-to-date designs were obtained from the U. S. Bureau of Fisheries (now a Bureau of the Fish and Wildlife Service) and actual construction got under way.

The station now consists of:

1. A stone masonry diversion dam
2. Some 1400 feet of eight-inch water feed line.
3. Six concrete raceways 4x5x66 feet.
4. Ten circular concrete pools 25 feet in diameter.
5. A stone building 26x56 feet for grinding and storing fish food, storage of equipment and garage space.
6. Two springs boxed in concrete and piped to a 10,000 gallon concrete reservoir for service use at the buildings and for cooling the water in the pools.
7. Roads and parking space.
8. A stone dwelling for the use of fish culturist assigned to this station nearing completion.
9. Construction of bridges, trails, and landscaping underway.

The station has a capacity of 200,000 three-inch trout and is operated at present as a branch of the Federal hatchery at Lamar, Pennsylvania. The first shipment arrived in the spring of 1940. In the two years the station has been in operation, more than 280,000 trout have been reared there and distributed by the CCC camps to more than 70 different streams within the Forest.

## STOCKING PLANS CURRENTLY REVISED

During the winter of 1941 the data on all of the major trout streams on Allegheny National Forest were reviewed, stream by stream, by technicians from both the Pennsylvania Fish Commission and the Forest Service. Revisions were made where field data indicated the need for a change in the plans. Complete data has been recorded on 118 streams within the Forest. Thirty-three of the large streams are now scheduled to receive legal size trout and about 70 are listed to receive fingerlings.

The plans are flexible so as to permit re-scheduling of plantings when variable factors, such as the drought this year, interfere with the normal schedule. Local on-the-ground fish management is in constant operation to improve conditions under this cooperative system.

## OTHER INFLUENCES

The intensive system of fire control taken within the national forest are of untold benefit to the fishing streams within its boundary. During the past decade an average of only 400 acres have been burned over each year out of a total of 726,000. This is in the ratio of one acre burned to each 1800 acres protected. Without adequate fire protection any attempt at fish management would be a mockery indeed.

The selective cutting system under which national forest timber is harvested aids materially in keeping mountain trout streams in good condition. In addition a protective strip is left along all fishable streams where special restrictions are applied to maintain the best possible stream-bank and shade conditions.

Road bank stabilization, now a fixed policy on national forest roads, is bound to have a beneficial effect upon stream conditions. Unstabilized road banks are one of the chief causes of stream silting.

## FISHING IS RECREATION

The Forest Service attempts to manage the lands under its jurisdiction so as to provide the greatest benefits to the greatest number of people. Good fishing and hunting provide excellent sport and recreation for thousands. Fishing alone furnishes over 150,000 man days of healthful outdoor enjoyment each season on Allegheny National Forest.

So, sportsmen, you may rest assured of our close cooperation with your Fish and Game Commissions and that our efforts will continue to be pointed toward making Allegheny National Forest your happy fishing and hunting ground

R. F. HEMINGWAY,  
*Forest Supervisor.*

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The Allegheny National Forest is fast becoming a most popular playground for all those interested in outdoor recreation. Particularly fortunate are the fishermen as an able staff is in charge and this year thousands of trout were planted.

Fishermen spend approximately 150,000 days each season on the National Forest streams, and in so far as Pennsylvania is concerned the statement was made that not a single fire was started during the trout season, which proves that they can enjoy their sport without endangering the public safety.

The following statement issued by Forest Supervisor, R. F. Hemingway, Warren, will prove interesting:

"October 7, 1940: The three CCC camps on the Allegheny National Forest have nearly completed the 1940 fingerling fish planting program. According to Forest Supervisor R. F. Hemingway of Warren, this includes some seventy-five streams in Elk, Forest, McKean, and Warren Counties.



Women's Pool, Spring Creek Project

"Altogether a total of 82,000 brook trout, 35,000 brown trout and 30,000 rainbow trout, from 2 to 6 inches, have been liberated. This amounts to more than sixteen hundred pounds by actual weight. The three inch brook trout number approximately 100 per pound.

"On their arrival at the Farnsworth Trout Rearing Station this spring it took approximately 1,000 to weigh a pound. The excellent care these fish received should be credited to the Fish and Wildlife Service of the U. S. Department of Interior who operate the station in cooperation with the Forest Service.

"By taking care of the stocking of fingerlings on the national forest, the federal government makes it possible for the Pennsylvania Fish Commission to concentrate on legal size fish and thereby afford much heavier catches than the stream would normally support. Fishermen spend approximately 150,000 days each season on the National Forest Streams and every effort is being made by these three cooperating agencies to supply them with a maximum amount of sport.

"If the released trout continue to grow in the streams as they have at the Rearing Station, many will be legal size by next fishing season. All trout streams are now stocked to capacity within the Allegheny National Forest, but as already stated, many additional fish of larger size will be planted by the Pennsylvania Fish Commission to offset in some measure the extremely heavy fishing these streams receive."

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#### **WATERS OPENED TO PUBLIC FISHING WITHIN LAST TWO YEARS**

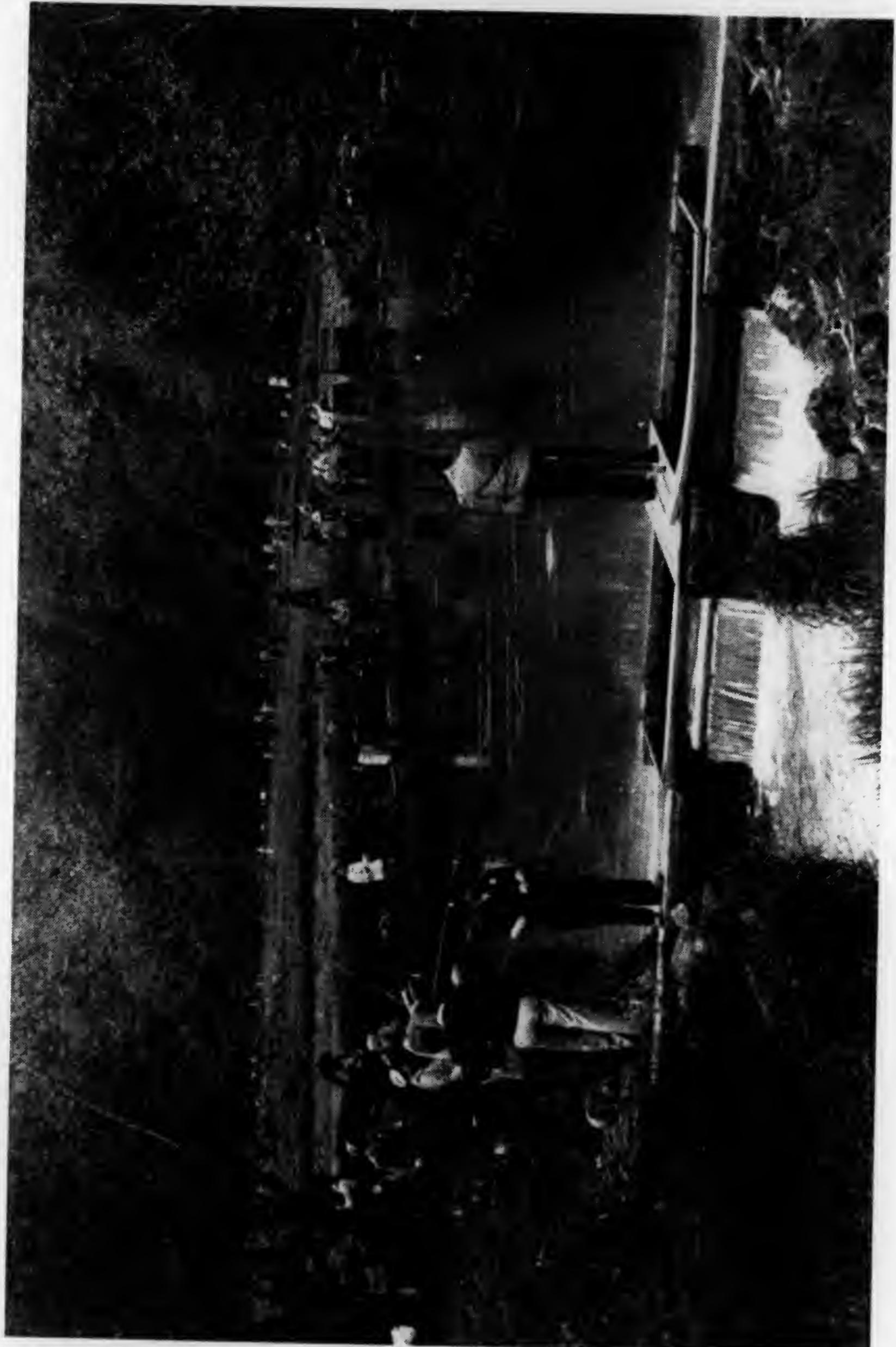
The Board is continually working to increase public fishing waters, and we believe the following statement will indicate that much progress has been made.

During the last biennium the Board also purchased what is known as Big Spring located at Springfield, Cumberland County. It was learned that this historical property was going to be sold and immediately the wheels were set in motion to purchase it for the fishermen.

This spring has perhaps the most historical background of any in the State. Records dating back to the early 1700's show there has been a constant flow of water, never falling below 10,000 gallons per minute. Weir tests made a short time ago showed this amount of water flowing from the spring.

It is planned to improve the dam at the mill site, and perhaps after the coming trout season the Board will drain the lake and remove the excess culm which has accumulated. No further plans for developing this property at the present time have been made other than improvement so it will be even a better fishing area than it has been in the past.

This has been one of the most famous fishing spots for the opening of the trout season in south central Pennsylvania and it is not an uncommon sight to find several hundred fishermen the opening day of trout season.



Women's Pool, Spring Creek Project

## INTENTIONAL 2ND EXPOSURE

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General View of Fishermen at Spring Creek Project

The Board believes that during the next biennium several excellent fishing areas will be made available. If you as a fisherman know of private fishing waters which can be acquired at a reasonable figure, we would suggest you contact the Harrisburg office giving such information as you may have.

**WATERS OPENED TO FISHING WITHIN LAST TWO YEARS**

Stream or Pond	County	Miles	Acres
South Sandy Creek .....	Venango .....	2	
Whitmore Run, Tr. to W. Br. Pine Cr.	Potter .....	4	
Beach Flat Brook, Tr. to W. Br. Pine Creek .....	Potter .....	3	
Stillwater Lake (previously fishermen were forced to rent boats to fish) .....	Monroe .....	250	
W. Br. Tionesta Creek .....	Warren .....	$\frac{3}{4}$	
Raymonds Kill Creek .....	Pike .....	$1\frac{1}{4}$	12
Billings Pond .....	Pike .....		
Wellendorf Run .....	Elk .....	4	
Robinson Run .....	Elk .....	3	
Clear Creek .....	Elk .....	2	
		(From source)	
Windfall Run .....	Elk .....	3	
Little Clear Creek .....	Elk .....	3	
Rocky Run .....	Elk .....	2	
Bobbys Run .....	Cameron .....	2	
		(From mouth to Boy Scout Camp)	
Little Slate Run, Tr. Pine Creek .....	Tioga .....	$1\frac{1}{2}$	
Little Four Mile Run, Tr. Pine Creek .....	Tioga .....	$1\frac{1}{2}$	
Steel Run, Tr. Pine Creek .....	Tioga .....	1	
Schambacher Hollow Run, Tr. Pine Cr.	Tioga .....	1	
Slide Island Draft, Tr. Cedar Run .....	Tioga .....	3	
Frying Pan Run, Tr. Cedar Run .....	Tioga .....	$1\frac{1}{2}$	
Buck Run, Tr. Cedar Run .....	Tioga .....	2	
Mine Hole, Tr. Cedar Run .....	Tioga .....	5	
Fahneystock Run, Tr. Cedar Run .....	Tioga .....	5	
Upper Cedar Run, Tr. Cedar Run .....	Tioga .....	5	
Hills Creek .....	Tioga .....	$1\frac{1}{2}$	
Norris Brook .....	Tioga .....	$1\frac{1}{2}$	
Blue Run .....	Tioga .....	2	
Jameson Creek .....	Tioga .....	1	
Right Branch Asaph Run .....	Tioga .....	$1\frac{1}{2}$	
Right Branch Straight .....	Tioga .....	$1\frac{1}{2}$	
Lick Run, Tr. Penns Creek .....	Centre .....	3	
Big Yellow Creek .....	Indiana .....	$1\frac{1}{2}$	
		(Open to Sunday fishing)	
North Park Lake .....	Allegheny .....	75	
Catawissa Creek .....	Schuylkill .....	3	
Three Springs Run .....	Bedford .....	$2\frac{1}{2}$	
Furrys Mill Dam .....	Bedford .....		1
Little Swatara Creek .....	Lebanon .....	1	
Lower Woods Pond .....	Wayne .....	60	
Upper Woods Pond .....	Wayne .....	80	
W. Br. Dyberry Creek .....	Wayne .....	6	
E. Br. Dyberry Creek .....	Wayne .....	6	
Middle Br. Dyberry Creek .....	Wayne .....	$2\frac{1}{2}$	
Alder Marsh Creek .....	Wayne .....	2	



General View of Fishermen at Spring Creek Project

The Board believes that during the next biennium several excellent fishing areas will be made available. If you as a fisherman know of private fishing waters which can be acquired at a reasonable figure, we would suggest you contact the Harrisburg office giving such information as you may have.

WATERS OPENED TO FISHING WITHIN LAST TWO YEARS

Stream or Pond	County	Miles	Acre
South Sandy Creek .....	Venango .....	2	
Whitmore Run, Tr. to W. Br. Pine Cr.	Potter .....	4	
Beach Flat Brook, Tr. to W. Br. Pine Creek .....	Potter .....	3	
Stillwater Lake (previously fishermen were forced to rent boats to fish) .....	Monroe .....	250	
W. Br. Tionesta Creek .....	Warren .....	$\frac{3}{4}$	
Raymonds Kill Creek .....	Pike .....	1 $\frac{1}{4}$	12
Billings Pond .....	Pike .....		
Wellendorf Run .....	Elk .....	4	
Robinson Run .....	Elk .....	3	
Clear Creek .....	Elk .....	2	
		(From source)	
Windfall Run .....	Elk .....	3	
Little Clear Creek .....	Elk .....	3	
Rocky Run .....	Elk .....	2	
Bobbys Run .....	Cameron .....	2	
		(From mouth to Boy Scout Camp)	
Little Slate Run, Tr. Pine Creek .....	Tioga .....	1 $\frac{1}{2}$	
Little Four Mile Run, Tr. Pine Creek .....	Tioga .....	1 $\frac{1}{2}$	
Steel Run, Tr. Pine Creek .....	Tioga .....	1	
Schambacher Hollow Run, Tr. Pine Cr.	Tioga .....	1	
Slide Island Draft, Tr. Cedar Run .....	Tioga .....	3	
Frying Pan Run, Tr. Cedar Run .....	Tioga .....	1 $\frac{1}{2}$	
Buck Run, Tr. Cedar Run .....	Tioga .....	2	
Mine Hole, Tr. Cedar Run .....	Tioga .....	5	
Fahneystock Run, Tr. Cedar Run .....	Tioga .....	5	
Upper Cedar Run, Tr. Cedar Run .....	Tioga .....	5	
Hills Creek .....	Tioga .....	1 $\frac{1}{2}$	
Norris Brook .....	Tioga .....	1 $\frac{1}{2}$	
Blue Run .....	Tioga .....	2	
Jameson Creek .....	Tioga .....	1	
Right Branch Asaph Run .....	Tioga .....	1 $\frac{1}{2}$	
Right Branch Straight .....	Tioga .....	1 $\frac{1}{2}$	
Lick Run, Tr. Penns Creek .....	Centre .....	3	
Big Yellow Creek .....	Indiana .....	1 $\frac{1}{2}$	
		(Open to Sunday fishing)	
North Park Lake .....	Allegheny .....	75	
Catawissa Creek .....	Schuylkill .....	3	
Three Springs Run .....	Bedford .....	2 $\frac{1}{2}$	1
Furrys Mill Dam .....	Bedford .....		
Little Swatara Creek .....	Lebanon .....	1	
Lower Woods Pond .....	Wayne .....	60	
Upper Woods Pond .....	Wayne .....	80	
W. Br. Dyberry Creek .....	Wayne .....	6	
E. Br. Dyberry Creek .....	Wayne .....	6	
Middle Br. Dyberry Creek .....	Wayne .....	2 $\frac{1}{2}$	
Alder Marsh Creek .....	Wayne .....	2	

**WATERS OPENED TO FISHING WITHIN LAST TWO YEARS**  
—Concluded

Stream or Pond	County	Miles	Acres
Little Neshannock Creek .....	Mercer .....	1	
W. Br. Little Neshannock Creek .....	Mercer .....	½	
Pine Run .....	Mercer .....	½	
Deer Creek .....	Mercer .....	1	
Neshannock Creek .....	Lawrence .....	1	
Hickory Creek .....	Lawrence .....	½	
Taylor Run .....	Lawrence .....	½	
Mud Pond (Wheaton's Pond) .....	Wyoming .....	75	
Oxbow Lake .....	Wyoming .....	45	
N. W. Br. Perkiomen Creek .....	Berks .....	5	
Laurel Run, Tr. Shermans Creek .....	Perry .....	1	
Shaffers Run, Tr. Shermans Creek .....	Perry .....	1	
Liberty Run, Tr. Tuscarora Creek .....	Perry .....	1	
Kansas Run, Tr. Horse Valley Run .....	Perry .....	1	
<b>Totals .....</b>		<b>107</b>	<b>598</b>

### SPRING CREEK PROJECT

The Spring Creek Project, which was opened in 1934 and is known to most fishermen as the "Fishermen's Paradise," has been visited by representatives from practically every state in the Union and still proves to be a most popular fishing ground.

The following table is interesting as it shows the conditions of today compared with the opening:

	1934	1940
Number of Registered fishermen .....	2,952	16,891
Number fish caught .....	5,907	18,750
Number fish killed .....	2,472	8,149
Number pounds fish killed .....	1,359	8,390
Average length fish killed .....	10.8 in.	13.47 in.
Average weight fish killed .....	8.8 oz.	16.47 oz.

In order to get the real picture of just what a project of this kind means to a stream it is necessary to make a personal visit. It not only improves the stream for fishing but also increases the food supply which is so vital to the success of any fishing water; in other words, properly done, you have a well balanced area which should continue to produce each year.

The following is a record of the number of fishermen by counties attending the Project in 1940, also the number of representatives from various states in the Union:



Administration Building at Spring Creek Project



Parking at Spring Creek Project

RECORD OF INDIVIDUAL FISHERMEN ACCORDING TO  
COUNTIES—1940

County	Men	Women	Children
Adams	22	4	8
Allegheny	239	35	46
Armstrong	27	7	5
Beaver	18	2	4
Bedford	76	14	12
Berks	28	1	2
Blair	604	70	113
Bradford	1	0	0
Bucks	9	2	1
Butler	12	2	1
Cambria	927	77	201
Cameron	6	2	1
Carbon	7	2	0
Centre	607	88	159
Chester	7	0	0
Clarion	16	2	1
Clearfield	577	65	158
Clinton	199	30	32
Columbia	23	1	2
Crawford	11	0	1
Cumberland	114	18	9
Dauphin	230	20	22
Delaware	11	2	0
Elk	65	7	16
Erie	7	0	2
Fayette	32	3	3
Franklin	24	1	5
Forest	2	1	0
Fulton	4	0	0
Greene	8	0	1
Huntingdon	187	31	39
Indiana	178	10	32
Jefferson	63	6	12
Juniata	48	1	9
Lackawanna	3	1	0
Lancaster	31	4	7
Lawrence	3	0	1
Lebanon	26	3	3
Lehigh	19	2	1
Luzerne	39	6	3
Lycoming	173	31	29
McKean	18	4	6
Mercer	13	1	1
Mifflin	426	52	118
Monroe	0	0	0
Montgomery	32	2	3
Montour	8	1	0
Northampton	10	4	0
Northumberland	179	29	32
Perry	33	5	10
Philadelphia	26	4	5
Pike	0	0	0
Potter	1	0	0
Schuylkill	282	31	44

RECORD OF INDIVIDUAL FISHERMEN ACCORDING TO  
COUNTIES—1940—Concluded

County	Men	Women	Children
Snyder	75	10	4
Somerset	161	24	20
Sullivan	3	1	0
Susquehanna	2	2	0
Tioga	13	0	1
Union	28	3	4
Venango	10	1	1
Warren	3	1	1
Washington	43	9	8
Wayne	1	0	0
Westmoreland	193	33	34
Wyoming	3	1	0
York	17	4	1
Out of State			
Connecticut	3	0	0
Delaware	2	0	0
Florida	1	0	0
Illinois	3	0	1
Indiana	2	0	0
Maryland	8	0	0
Michigan	1	0	0
Minnesota	2	1	0
Kansas	1	0	0
New Jersey	9	0	0
New York	12	5	1
North Carolina	1	0	0
Ohio	33	3	9
Oklahoma	1	0	2
Tennessee	1	0	0
Texas	1	0	1
Virginia	1	1	0
West Virginia	2	0	0
Wisconsin	1	1	0
District of Columbia	3	0	0

**THE FOLLOWING SPECIAL PROJECTS ARE SET UP  
ON THE FOLLOWING WATERS, EFFECTIVE  
UNTIL JULY 31, 1943**

Fishermen should be guided by rules and regulations posted along streams regarding size, season, number, etc.

**SLATE RUN (Lycoming County).**

*Section Open to Fishing*—From the junction of Cushman and Francis Branches down to its mouth at Big Pine Creek, approximately 8 miles.

*Closed Section*—Partly in Potter, Tioga and Lycoming Counties—both Head Forks, the Cushman and Francis Branches, and all other tributaries closed as nursery waters.

YOUNG WOMAN'S CREEK (Largely in Clinton County, heads in Potter County).

The main stream of the Right Branch of Young Woman's Creek from the mouth of Lebo Branch to the junction with the Left Branch is closed to the use of any but artificial lures. No live bait of any kind is permitted.

Only six trout may be taken per day, per person.

Only thirty-six trout may be taken per person, per season.

The legal minimum size limit is six inches.

No person may have in possession any baitfish or fishbait while fishing the restricted area.

All tributaries of the Right Branch of Young Woman's Creek open without restrictions.

DUNBAR CREEK & TRIBUTARIES (Fayette County) (See posters along stream for special regulations.)

LYNN RUNN (Westmoreland County). Laurel Hill Trout Nursery on this stream.

NORTH FORK CREEK (Jefferson County)—From 2000 feet below Egypt Bridge to the source. (Improved Stream). (Jefferson County Sportsmen's Association.)

E. BRANCH CLARION RIVER (Elk County)—Portion between Glen Hazel and Instanter. (Request Elk County Sportsmen's Club).

MARKLE'S POND (Westmoreland County). (Request West Newton Sportsmen's Association.)

LAKE DOM (Westmoreland County). (Request of Westmoreland Sportsmen's Association.)

SILVER LAKE (Bucks County). (Request Pennsylvania Federation of Sportsmen's Clubs of Bucks County.)

KOON LAKE (Bedford County)—Number of trout to be taken in any one day limited to three (3). (Request Bedford County Federation of Sportsmen's Clubs.)

NATIONAL FORESTS (Agreement U. S. Dept. of Interior, National Park Service and Board of Fish Commissioners).

Trout—April 15 to July 31—7 A. M. until 7 P. M., E. W. T. Regular size, fishing devices and bag limits as set up under the Pennsylvania Laws to be observed, unless property is otherwise posted.

Warm Water Species—April 15 until May 31 and from September 15 until November 30, all dates inclusive, between 7 A. M. and 7 P. M., E. W. T. Regular size fishing devices and creel limits as set up under the Pennsylvania Laws to be observed, unless property is otherwise posted.

Children in group camps under 16 years of age, can fish with one rod and line with single hook and may take four (4) fish per day, the fish being restricted to warm water species, without a license.

LAKE PLEASANT (Erie County). (Request of Erie County Sportsmen.) Number of trout to be taken in any one day—six (6).

SPRING CREEK ON PENITENTIARY GROUNDS—Open to the public fishing with rod, hook and line during trout season, April 15 to July 31, 7 A. M. to 10 P. M., E. W. T. Fishermen not permitted on the property between 10:30 P. M. and 6:30 A. M., E. W. T.

**STREAMS CLOSED AS NURSERY WATERS BY THE  
BOARD OF FISH COMMISSIONERS AND ALL  
FISHING PROHIBITED UNTIL  
JULY 31, 1943**

County	Name of Stream or Water
BERKS	Ontelaunee Lake, Section requested by Federated Sportsmen's Clubs of Berks County, also from new dam breast upstream to the old stone bridge, distance about one mile on the west side. <i>Maiden Creek</i> —1200 feet on west side below new dam breast. 1800 feet on east side below new dam breast.
BUTLER	<i>Municipal Reservoirs</i> of Boro of Zelienople.
CAMERON	<i>Crooked Run</i> , Entire length. <i>Finley Run</i> , 2 miles. <i>Fishing Creek</i> , Trib. to Driftwood Branch. <i>Big Spring or Big Spring Draft</i> , Trib. to Wykoff Run. <i>Whippoorwill Run</i> , Trib. East Branch of Hicks Run, one mile long. <i>Little Fork</i> , Trib. to Mix Run, one and one-half miles long. <i>Fireline Creek</i> .
CARBON	<i>Headquarters Chester Creek</i> —From and including Fern Hill Dam Reservoir, upstream 2 miles.
CHESTER	<i>All tributaries of Haslett Run</i> . <i>All tributaries of Curry Run</i> . <i>Gottshall Run</i> (Stream closed for protection of water supply).
CLEARFIELD	<i>Beech Creek</i> , From dam at Beech Creek to Orviston.
CLINTON	<i>Pymatuning Sanctuary</i> . <i>Northern and Shenango River</i> , below dam at Pymatuning Lake. <i>Smith Run or Rocky Run</i> , Entire length. <i>Hyvie Run or Spring Run</i> , Entire length. <i>Falls Shanty or Auman Hollow</i> , Entire length.
CLINTON AND CENTRE	<i>Falls Shanty</i> , Three miles flowing into the E. Branch of Kersey Run. <i>Spring Run</i> , From what is known as "Bony Gerg's Bridge" to source. This is headwaters of Spring Run and about 5 miles long.
CRAWFORD	
ELK	

ELK AND FOREST	<i>Maple Run</i> , Trib. to Bear Creek, 3 miles. <i>Cherry Mill Run</i> , Trib. to Big Mill Creek, 2½ miles.	POTTER	<i>Blumendal Run</i> , Trib. to Little Kettle Creek, 2 miles long. <i>Lutz Run</i> , Trib. to Pine Creek, 1 mile long. <i>Upper Dry Run</i> , Trib. to W. Branch of Pine Creek, 1 mile long. <i>Barns Brook</i> , Trib. to Cushing Creek, 5 miles long. <i>Crowell Run</i> , Trib. to Nine Mile Creek, 1½ miles long. <i>Splashdam Run</i> , Trib. to Lyman Run, 2 miles in Susquehanna District State Forest. <i>E. Fork of First Fork Sinnemahoning Creek</i> , Tributary to Sinnemahoning Creek. <i>Stonelick Run</i> , Trib. to E. Fork of First Fork of Sinnemahoning Creek. <i>Birch Run</i> , Trib. to E. Fork of First Fork of Sinnemahoning Creek.
JEFFERSON	<i>Bear Pen Run</i> , Trib. to North Fork Creek. <i>Williams Run</i> , Trib. to North Fork Creek.		
JEFFERSON AND ELK	<i>Rattlesnake Creek</i> , Trib. to Little Toby Creek, 3 miles, from ½ mile below Brockway Reservoir to source.		
LANCASTER	Stream running through Public Park at Lititz (Exhibition).		
LUZERNE	<i>Octoraro Creek</i> , Portion of W. Branch. <i>Sugar Notch Dam</i> , About one third. Approximately 2 acres of <i>Harveys Lake</i> . <i>Cummings Pond</i> , Approximately 1¼ acres in Franklin Township, taking in 1500 feet of shore line. (Period of closing until further notice.)		
LYCOMING	<i>All tributaries of Slate Run</i> . <i>All tributaries of Pleasant Stream</i> . <i>Portion of tributaries of Pine Creek</i> . <i>Portion of tributaries of Lycoming Creek</i> . <i>Black Hole Creek</i> , From Water Company Dam downstream to Penna. Railroad culvert, ¼ mile.	SCHUYLKILL	Nursery Pools on the Old Schirner Farm (Request of Tamaqua Rod and Gun Club, Tamaqua). <i>Locust Creek</i> , About 6000 feet (Posted by Game Commission.)
McKEAN	<i>Fly Brook</i> , Trib. to Willow Creek, 2½ miles. <i>Wintergreen Run</i> , Trib. to Kinzua Creek, 2 miles. <i>Brown Valley</i> , Trib. to N. Fork Sugar Run, 1½ miles. <i>Right Hand Branch</i> , of W. Branch of Tuna Creek, 1 mile. <i>Blind Robin</i> , Trib. to Main Sugar Run, 2 miles. <i>North Fork of Colegrove Brook or Nigger Run</i> , Trib. to Colegrove Brook.	SOMERSET	<i>Three Miles of Brush Creek</i> , Trib. to Wills Creek. <i>Beaver Dam Creek</i> , From Sportsmen's Dam to source.
MONTGOMERY	2 Ponds on Howard Beidler property at Abrams. 1 Pond on Frank Henkins property at Collegeville. 1 Pond on G. B. French property at Graterford. 2 Ponds on Joseph Hippel property at Norwood.	VENANGO	<i>Sugar Lake</i> , Special Posters during spawning season.
PIKE	<i>Portion of Pecks Pond</i> , Above wire on E. Branch inlet. <i>Portion of Promise Land Pond</i> .	WARREN	<i>Four Mile Run</i> , Trib. to Tionesta Creek, all tributaries and <i>Long Run</i> , also <i>Ludlow Branch</i> of same stream. <i>Farnsworth Run</i> , Trib. to Tionesta Creek, from source to point 1 mile below Hermit Spring, also <i>Criswell Branch</i> . <i>Headwaters of Brown Run</i> , Including all of <i>Hook Run</i> , <i>Fluent Branch</i> also upper 1½ miles of <i>Brown Run</i> . <i>Dedman Run</i> , Trib. to Spring Creek, ½ mile. <i>Greeley Run</i> , Trib. to Spring Creek, three-fourths mile long.

NOTE: Under the provisions of the Game Code, all Refuges are closed to hunting and fishing. If any streams within the Refuges are open to public fishing cardboard posters, so stating, are prominently displayed.

## JUNIOR CONSERVATIONISTS

Our hats are off to the Junior Conservationists of Pennsylvania!

We have said many times, and repeat again—conservation of the future rests with the youth of today, and no matter how small the organized group may be, you will find that within a few years the results will be amazing.

More than ever before, organized sportsmen and individuals have taken these lads under their wings, and we now have hundreds of Junior organizations in Pennsylvania.

We older sportsmen certainly owe a vote of thanks to these boys for their efforts in furthering the conservation program in Pennsylvania. Their activities in helping to improve the streams of Pennsylvania in their campaign to control the water snake problem—the feeding program in connection with the work of the Game Commission—and many other activities—comprise the program of these future sportsmen.

We have been intimately associated with some of these groups, and it has also been our privilege to recommend quite a number of groups for citation to the Boy Scout Court of Honor for the fine job they have done.

Many areas have already set up certain standards for the awarding of merit badges which not only cover the required number of snakes, but also provide that those qualifying must know the principal natural resources of their locality—the principal fish, birds and animals—their seasons and how protected, present evidence of direct assistance in conservation projects, such as fighting forest fires—help in checking erosion, building shelters, planting trees, etc.

The Board, in cooperation with various sportsmen's groups, has attempted to prove to the boys that we appreciate the interest they have shown, and has set aside a large number of ponds or lakes to be fished exclusively by youngsters under 16 years of age. This movement spread all over the State and toward the end of the 1939 fishing season it was a real problem to furnish enough fish to keep these projects going.

One of the things we particularly like about this program is the fact that it gives many thousands of under-privileged children who never saw a fishing pole before, a chance to enjoy this most healthful recreation. A number of these projects have been located in the metropolitan areas of our State, and we know by personal contact that the fishing afforded these youngsters filled a large gap in their lives.

In almost every instance where such a pond or lake was set up, local sportsmen's groups had supervision over the fishing, and a number of our sportsmen spent a great deal of time teaching the youngsters the art of fishing, and instilling in them the meaning of good sportsmanship.

If you do not have such a group within your organization, we again say that if we can be of assistance in forming one, contact the Harrisburg office and we will have a competent representative get in touch with you, who will be of every assistance possible.

## MOTOR BOATS ON INLAND WATERS

The first year motor boats were licensed, 1,563 licenses were issued; in 1940, 7,962.

The motor boat has given the Board much concern, particularly during the last year. In many sections boats are being operated on small streams and bodies of water where they have done considerable damage to the shoreline and practically ruined the fishing. It is impossible in Pennsylvania to have both good fishing and motor boats on the same body of water with the exception of a few of the larger lakes. We agree that this form of recreation has its place in the picture the same as any other, but when it is ruining recreation for thousands and only benefiting a few, something should be done to adjust the difference.

In many sections conferences have been held, with the result that a much better relationship exists between the motor boat owner and the fisherman.

Several articles have been written in reference to the damage resulting from oil coming from exhausts. The following article by Mr. Buller, our Chief Fish Culturist, will prove of interest.

An article was published recently by one of the midwestern states covering observations on the effect of operating motor boats over the Bluegill spawning beds in the inland waters and the effect that it might have upon aquatic life.

The water displaced by the movement of the boat at different speeds and the water displaced by the propeller at various depths should, in my judgment, have no more effect upon the Bluegill spawning beds than the wave action on the shore lines, caused by the wind; and this movement causes little, if any, ill effect to these spawning areas.

The following are the disadvantages of the operation of motor boats on inland waters:

### INTERNAL COMBUSTION MOTORS

(a) *Oil*: Oil on water destroys plankton and other fish food organisms that come to the surface for respiration or other purposes. This is known to be a fact from observations made in the use of oil in mosquito control projects, and its use on hatchery ponds to destroy certain insect larvae. It is very destructive to plant life and injurious to very small fish that come in contact with it, and at certain times an oil film may retard the normal exchange of gases to and from the water area. Regardless of the carefulness of the operator, oil from this type of motor boat finds its way into the water. A small drop of oil covers a large water surface. Furthermore oil on water is more or less accumulative. The operation of one motor for a season may cover a large water area with an oil film. This film may be so thin that it is not noticeable to the naked eye, but is sufficient to do harm to aquatic life.

(b) *Gasoline*: Largely through carelessness, gasoline is spilled overboard and contrary to the opinion of many, it is retained by the water for some length of time. This is not only destructive to aquatic life of all kinds but is injurious to water fowls as well. This has been demonstrated on several occasions—the last being Thompson Run, in Centre County, Pennsylvania.

(c) *Propellers*: The action of the propellers breaks off or uproots aquatic vegetation, and in most water areas, this growth is very essential.

(d) *Recreation*: The majority of the inland lakes and ponds provide recreation for those who enjoy angling, boating and swimming. Power propelled boats not only interfere with these activities, but in many cases constitute a dangerous hazard. Thus the pleasures of many are curtailed for the enjoyment of a few.

#### ELECTRIC PROPELLED MOTOR

(e) The electric propelled boats eliminate the discharge from the use of oil and gasoline, and to some extent cut down the hazard to others from excessive speed. The chief detrimental factor would be the uprooting or breaking off of aquatic plant life.

#### SHAD FISHING

The story of shad fishing in the Delaware River within the confines of the State of Pennsylvania for the past twenty years has not made interesting reading. The records prior to that time show that in 1905 the Philadelphia markets handled 412,500 shad, representing a value of \$268,370.00. In addition to this, there were shipped to the New York markets 507,270 shad, with a value of \$152,181.00, or in other words, a total catch of 919,770 shad with a value of \$424,556.00. If we can depend on the records, the 1904 season yielded about 1,200,000 shad. The heaviest catches were made from Ship John Light to Alloway's Creek, a distance of about twenty miles.

In 1910 the Philadelphia markets handled 376,000 and New York markets 204,243, or a total of 580,243, and the market value dropped considerably, amounting to only \$191,457.00. In 1916 the catch was far below normal; however, the price increased (due to the small catches), giving the fishermen as much in return as they had in former years. A search of the records indicates it was during this year the shad run diminished, and from that time until three years ago very few shad were taken in so far as Pennsylvania was concerned.

During the last two years the run of shad in the Delaware has improved. The Board's officers inspected many of the fisheries along the Upper Delaware and found that the maximum catches amounted to around 110 shad where in previous years thousands were taken. Apparently there are a great many shad spawning as thousands have been observed returning to the sea in the early fall.

In one of the recent issues of "Fishery Market News," a publication of the United States Department of Interior, Albert Woodfield, Chairman of the Commercial Fisheries Advisory Committee of Maryland, had the following to say on shad:

*Present Situation*: The yield of shad in the Chesapeake has declined from 15 million pounds to about one million pounds during recent years. At the low average of five cents a pound this decline is costing the Chesapeake fishermen 15,000,000 pounds—1,000,000 pounds =  $14,000,000 \times 0.5 = \$700,000.00$ . This loss is evidenced by the great decline in the number of fishermen and the income from the fish that are

now not being caught. More than this, people, in general, are not assured of a dependable big supply of this fine fish food with the result that the market is uncertain and, in addition, the dealers who handle the products are not making money from the bigger sales.

"The Advisory Committee has been asked, and has continued to ask others, what has been the cause of this decline. A lot of suggested explanations have been offered to us such as (1) pollution, (2) Virginia fishermen, (3) destruction of breeding grounds, (4) insufficient hatchery work, (5) Conowingo Dam, (6) motor boats, (7) trawling in the ocean near the Capes, (8) shad enemies, and (9) over-fishing.

"Scientists at the Chesapeake Biological Laboratory and of the United States Government have made extensive checks on all these theories as to why shad have declined, and they have eliminated every single factor as a major element except over-fishing.

"(1) We realize that there is some pollution, especially in the vicinity of Baltimore. Until the shad came back so strongly and abundantly in the Hudson River, where pollution is many times worse than it is in any of the Chesapeake areas, we had thought that this was an important factor in shad conservation. Pollution is now considered to be of little importance.

"(2) The Virginia fishermen have suffered depletion, but not as great as Marylanders, for in the James, York, and Potomac Rivers, fished only by Virginians, the catches of shad are relatively better than in the Maryland rivers and in the Bay proper. Records of the catches and the tagging done by scientists offer evidence that Virginia is not so largely responsible for Maryland depletion.

"(3) The breeding grounds are, with very minor exceptions, still intact and the water over them is as clean and chemically pure as it has been during the past few decades.

"(4) Maryland has hatched millions upon millions of shad fry yearly—about 10,000,000 in 1940. In spite of this the supply has gone down. New York has hatched only a fraction as many shad as we have, yet up there the fish has been restored. This doesn't argue well for hatchery results nor does it leave us ground to expect much for shad replenishment in the Chesapeake. Hatching doesn't seem to be our answer.

"(5) The Conowingo Dam cannot carry the full blame or even a large part of the blame for the decline of Chesapeake shad, since records show that the decline started before the dam was built and that the supply has not diminished faster since the dam was built.

"(6) Motor boats are not an explanation, since certain of the high points in shad production in the Chesapeake Bay have taken place since motor boats became common.

"(7) Chesapeake shad have been shown, through tagging and scale studies, to return to the Chesapeake Bay where they are hatched. More than this, once they have been to the Chesapeake Bay and then tagged and thrown overboard they have been shown to come back to the Chesapeake Bay only, and not to other bodies of water. All of the scientific work done indicates that Chesapeake shad cannot and are not turned from the Chesapeake Bay by trawlers or motor boat operations. In this connection there is no scientific indication that Chesapeake fish have

left local waters and gone to the Hudson to increase the supply there. The *two fish are different breeds* and, as most fishermen know, even 'smell different'.

"(8) Shad have always had enemies in the Chesapeake Bay such as eels, perch, and a great number of other forms both large and small. Their great reproductive capacity then and now indicates that the fish enemies are not responsible for the decline. More than this, in the Hudson where shad has been restored there is an abundance of eels, carp, bass, and other fish enemies of the shad.

"(9) It is generally recognized by Chesapeake fishermen that there has been too much fishing with the result that so many fish have been taken out of the water that not enough have been left to carry on the natural function of reproduction. This over-fishing has developed into failures, financial losses, and continued hard times for the fishermen in general. Since all the factors named above, either singly or combined, do not offer a sufficient explanation for the decline of the shad and herring fisheries the rest of this memorandum will be devoted to a discussion of over-fishing and suggested remedies for same in the hope that the shad supply will be brought back.

\* \* \* \*

**Conclusion:** There are certain simple facts that confront us Chesapeake fishermen and we should make up our minds to face them or else join the big group of people who have invested much money and time only to be wiped out by ultimate failure. These simple facts are:

"(1) Each fisherman must use enough gear and catch enough shad to make a living.

"(2) All of the fishermen together must not take more fish from each year's run of shad than will permit a sufficient brood stock to be kept in the waters in order to assure next year's run. Bear in mind in this connection that the fish we leave in the waters in a given year are not lost and most of them return the following year at a larger size to spawn again.

"(3) New fishermen must be kept from taking the place of the ones that quit until, without reducing the income of the remaining fishermen, enough shad escape to do the required job of reproduction. We feel that this kind of control is legally possible, since it is similar to the control of sheep grazing on public ranges and to taxicab control in Baltimore City, all for exactly the same reasons."

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### STRIPED BASS

Pennsylvania has no coastal waters. However, various groups in the Philadelphia area have been greatly interested in recommendations made by several of the coastal states asking that legislation be enacted to protect the striped bass.

A suitable bill was prepared by those interested, passed by the Legislature and signed by Governor James, providing that any striped bass or rock fish under eighteen (18) inches in length caught in waters wholly

within this Commonwealth or any striped bass or rock fish under eighteen (18) inches in length caught in waters without this Commonwealth and received in interstate commerce or otherwise, could not be sold.

It will take some time to educate the wholesale and retail dealers as to the provisions of the bill. The majority of the coastal states have a sixteen inch size limit; however, their fish are measured from the tip of the nose to the fork of the tail, while in Pennsylvania the measurement is from the tip of the nose to the spread of the tail, which would be almost the same.

The Bureau of Fisheries, Department of Commerce, Washington, issued an interesting article under the heading "Recommendations for Conservation of the Striped Bass on the Atlantic Coast." So that those interested in striped bass fishing will be familiar with their thoughts it is quoted herewith. We believe it gives a clear and concise statement as to the benefits expected if the legislation becomes effective in all the states on the eastern seaboard.

"In response to numerous requests from sportsmen, commercial fishermen, dealers, and conservation officials of several states the Bureau submits these recommendations for conservation of the striped bass along the Atlantic Coast.

"It is recommended on the basis of existing knowledge and as a basis for a practical experiment in conservation that all striped bass on the Atlantic Coast under sixteen inches (measured to the fork of the tail) be protected by appropriate legislation.

"It has often been said that it is necessary to permit fish of any species to spawn at least once. However, this is not always a sound principle in fisheries management. For example, application of this principle would render it theoretically impossible to take any salmon at all whereas practical experience has shown that good runs can be maintained by allowing only half of the run to spawn. Similarly, the recovery of the shad runs in the Hudson under management policies which protect less than half of the spawners is further evidence that it is not always necessary to allow all fish to spawn. The recent life history studies by Merriman and Vladykov have demonstrated that not all of the striped bass are needed for spawning. The bass is one of the numerous species of marine fishes subject to year-class dominance. The numbers of young produced are, within very wide limits, independent of the numbers of spawning adults. For example, the 1934 brood, which has temporarily restored abundance in both Chesapeake Bay and along the shores north of Delaware Bay was produced in a year in which the numbers of fish old enough to spawn were below average. Similarly, other years in which large fish were much more numerous than in 1934 produced many fewer young. Practically, this means that maintenance of large numbers of spawners gives no assurance of successful reproduction. To be sure some spawners are needed but as long as spawning adults are at least as numerous as they were in 1934 good reproduction can occur if other conditions are favorable.

"In New York and Southern New England there is an additional reason why protection of fish until they have spawned is of very doubtful value. The unusually large numbers of striped bass present in those waters during the last three years were not the product of local spawn-

ing but were immigrants from the spawning and nursery areas in Chesapeake Bay. Moreover, there is good reason to believe that this condition has prevailed for at least forty years. It is possible, of course, that the history of forty years of unsuccessful spawning in these waters is in part due to insufficient numbers of spawners but in view of the fact that such temporary increases in abundance as have occurred from time to time during these years have failed to re-stock these waters leads to the strong suspicion that they are not at present and have not been for forty years capable of supporting large scale reproduction.

"In view of the uncertainty of augmenting the numbers of young striped bass produced by spawning, these recommendations have been based on the principle of managing the fishery to secure the maximum value from each brood, large or small, as it comes along. This, in effect, means that fish should be allowed to grow as long as the gain from growth is adding more pounds of fish to each brood than are being lost by mortality. In order to estimate the exact point at which the harvest should begin more detailed and more complete catch records are needed than are available. Consequently, any estimate must be regarded as the basis for an experiment and since any increase in the existing minimum size limits involves giving up a bird-in-the-hand, or rather a fish-in-the-net, in the expectation of getting not two fish but a bigger fish in the future, the recommendation should be conservative. The technical details of the computations by which an estimate of the optimum size for harvesting each year's crop of striped bass has been arrived at are presented in Dr. Merriman's report recently submitted for publication. It will suffice here to say that with due regard to estimates of total mortality of the withdrawals by the fishery, of rate of growth, and the market value of various sizes of bass, it may be conservatively estimated that the commercial fishery will take and the dealers will handle more pounds of fish and make more money out of them if striped bass are protected until they reach a length of 16 inches (measured to the fork of the tail). This estimate has been based on rather scanty data as to the rate at which the 1934 year-class has disappeared from the fishery between 1936 and 1937, and rather scanty data from tagging experiments as to the percentage of this apparent mortality attributable to the fishery. It is believed, however, that the recommended size limit is conservatively low, and that the benefits to the fishery will be greater than present data indicate. Moreover, such a size limit will protect virtually all two-year old fish and is preferable to a limit either slightly higher or slightly lower because during the period of heaviest fishing there are few fish of this exact size thus simplifying the problem of sorting.

"In view of the possibility that additional profits from each year's crop could be secured if striped bass are protected at an even higher size than that recommended here as an experiment we believe it important to follow closely the results of this recommendation when adopted. This will require that more detailed and more complete records of the catch be provided and that additional tagging experiments be made which are designed not so much to study migration as to measure the percentage of fish of various sizes removed by the fishery and to estimate more directly the probabilities of eventual recapture of small fish protected.

"It may be pointed out that if protection be afforded striped bass until they reach 16 inches (measured to the fork of the tail), even though the primary object is to increase the quantity of fish harvested from each year's brood, the number of fish reaching sexual maturity will also be increased. This can certainly do no harm and may do some good. Certainly it will cast some light on the question referred to above as to whether the long history of unsuccessful reproduction in New York is the result of inadequate numbers of spawners.

"These regulations should be adopted over the whole range of the species on the Atlantic Coast. There are some differences in rate of growth in different localities and further study may indicate the desirability of slight differences in size limits in accordance with such differences in the rate of growth. The present regulations are sufficiently conservative, however, that it is virtually certain that they will show a profit wherever adopted. In this connection it should be pointed out that the New York market absorbs a very large part of the whole production along the Atlantic Coast. The dealers in this market quite properly oppose any proposal which will forbid them to deal in fish less than 16 inches if the fish are legally taken. Their position is that if the fish may be legally caught in any state that they will be sold and that it would be an unwarranted interference with their rights as merchants to deny them their normal share in the business. If, however, uniform restrictions along the whole coast are provided the dealers in the Fulton Market will share in the increased production which will result from protection.

"It should also be pointed out that nothing of value is accomplished if fish are merely kept from the markets. It is also necessary that the capture of small fish be avoided or that if caught incidentally to the fishery for other species that they be sorted out and returned to the water alive. This imposes a responsibility on commercial fishermen, especially those using pound nets and haul seines. Anything less than their whole-hearted cooperation will more than nullify the benefits to them of legal protection for if small fish are destroyed not only will the potential gains from growth be lost, but also present market value of such fish. In most localities and under most conditions young fish can be sorted out alive and the experience gained in tagging them indicates definitely that the rate of survival is high. It is recognized, however, that at times conditions of weather and tide would render sorting of catches difficult if not impossible. These difficulties should be recognized in the law and enforcement officials should act in accordance with the spirit of the law and according to the dictates of common sense.

"Finally, it should be pointed out that the foregoing recommendations have been designed to increase the value of the annual crop taken commercially. This is in accordance with the assumption that the striped bass, like most other marine species, is capable under proper management, of yielding more fish than are needed by anglers and that to limit exploitation to the comparatively small quantities taken for sport would constitute wasteful under-utilization. It is, of course, true that the striped bass under the best of management is quite incapable of producing yields comparable with many other marine species such as the haddock, the cod, and the mackerel. On the other hand, we do not know

how great its productive capacity is and we shall not know until we have experimented with better management and the adoption of these recommendations may be regarded as the beginning of such an experiment. Until we have determined by experiment how much more striped bass can be produced it would be premature to consider reserving this species solely for angling. In 1931, the Bureau conducted a brief investigation of striped bass in Chesapeake Bay. At that time the scarcity was so great as to lead to the suggestion that the few bass produced could be utilized to better advantage for sport. A report incorporating this suggestion was prepared and submitted for publication at that time. Because of insufficient printing funds it was not published until this year and was not checked against additional information which has come to light within the last two years. The suggestions made therein with respect to angling and the commercial fishery cannot be maintained in the light of these additional facts."

## INTERSTATE COMMISSION ON THE DELAWARE RIVER BASIN

During 1939 this Commission took initial steps toward the creation of an advisory committee on fish and wildlife resources with the thought of developing a program of conservation which would benefit the states affected under this Commission, which are Delaware, New Jersey, New York and Pennsylvania. The initial meeting was held on January 5, 1940, and the agenda was as follows:

### I.

#### *Anadromous Fish*

In this section should be handled all problems concerning anadromous fish. Fish of this type found in the Delaware are limited, it is believed, to shad, sturgeon, and herring.

- A. Shad: regulations of the four states should provide for more or less uniformity as to:
  - 1. Licenses.
  - 2. Seasons.
  - 3. Lifting periods.
  - 4. The protection of spawning areas.
  - 5. Other administrative requirements such as the space between nets, the marking of nets, and administrative provisions to make certain that nets are lifted.

(In view of the interest of Incodel in pollution, it may be advisable to add to this part of the agenda a discussion of immediate measures to be taken to abate pollution in some of the tributary streams which were, or are, spawning areas for the shad. It is our understanding that the New York law already has all the necessary provisions as regards the Delaware River.)

- B. Pelican or Pinkster (young sturgeon). The important thing, again would appear to be an effort toward bringing the existing regulations into uniformity. The pelican is a young sturgeon and, if protected, it is our understanding that there is some chance

that the sturgeon fisheries in the Delaware may come back. Consideration of this possibility might include discussions as to:

- 1. The setting of high legal limits.
- 2. Forbidding the sale of pelican or pinksters in all the states concerned.

### II.

#### *Fresh Water Fish*

Here again the main problem would seem to be to bring regulations and seasons into uniformity. It has been pointed out that there is a difference of several days between the season for bass in Pennsylvania and New York on the Upper Delaware. There are probably a great many similar discrepancies.

- A. Uniformity
  - 1. Seasons.
  - 2. Catch limits.
  - 3. Legal size limits.
  - 4. Types of gear, etc.
- B. Reciprocity as to:
  - 1. Enforcement.
  - 2. Licenses.
- C. The need for, and desirability of, a biological survey of the main river above Trenton, to determine fish life, and fish life potentialities. Based upon the findings, consideration should be given to an interstate stocking program.

### III.

#### *The Problem of the Bay, Lower River, and Off-Shore*

It would seem that the root of this problem, and possibly the basis of solution, is the compact between New Jersey and Delaware of 1907. This compact provides that neither state can change its law without the permission of the other state.

Here a great deal of work has been done. The previous Commission has published reports, and, furthermore, amendments to the compact introduced in the New Jersey and Delaware legislatures, if not completely satisfactory might provide a basis for further work. The problem here would seem to be one of negotiation and legislation.

Pennsylvania's representative stated that not only the Fish Commission should be represented but representatives should also be chosen from the Federation of Sportsmen's Clubs, the commercial fishermen and others who might be interested. The result was that a representative of the Federation was appointed and a representative from the Dover Fishing Club of Philadelphia as they were vitally interested in striped bass legislation.

Two meetings have been held and while only the groundwork has been laid, it is believed this group can do much for the rod and line fishermen through more uniform legislation and a study of the pollution of the Delaware Bay.

Honorable William C. Adams, Director of the Conservation Department of the State of New York is the Chairman of this committee, and it is hoped that another meeting will be called in the very near future.



**Rough Going**  
The above picture, which appeared in the March, 1939, issue of "The Great Lakes Journal," proved to be the most popular picture of the year. It shows a Great Lakes freighter running for shelter before a big sea. Eight to ten feet of water was pouring over the rail of the ship when this picture was taken.

## COMMERCIAL FISHING—LAKE ERIE

The commercial fishing on the Great Lakes has been a declining industry for many years. The Board of Fish Commissioners considers it a question of grave importance and one which should have the attention of all the states bordering the Great Lakes and the Dominion of Canada.

Many theories have been advanced as to just why the catches of the various species have declined. There are no doubt many contributing factors, some of which are pollution, over-fishing, type of gear, etc. This Board believes the subject should have serious consideration before the industry is ruined.

The following is the report of the Superintendent of the Erie Hatchery:

### BLUE PIKE

The 1939 production was very good; 1940 showed a sharp decline. Therefore no eggs were available. Many small pike are in evidence in the Pennsylvania waters and the same report comes from the Canadian side of the lake. This indicates that the next year's catch should show better production.

### YELLOW PERCH

Catch has been holding near yearly average from 1939 to and through 1940.

### WHITEFISH

While 1939 production was very good, 1940 made a new high record for Erie in any one season.

### CISCO

Records show 1938 production 370,000 pounds, small fish, amount of spawn taken below average. 1939, 228,000 pounds, small fish, amount of spawn taken below average. 1940, 33,531 pounds, much larger fish, more and better spawn taken. Note: Show of increase of Cisco in 1938, decrease in 1939, and sharp drop in 1940.

### POUND NETS AND GILL NETS

Pound nets had a depressive season, a sharp drop under the previous year, mostly on Blue Pike.

Gill nets (small mesh)—To date catch has been very discouraging in general. Large mesh (gill nets) for taking whitefish, while under the previous year's take, have held up fairly well.

### GENERAL COMMENT

Revenue from commercial fishing licenses for 1940 is slightly under 1939. This is notable as large tugs of heavy tonnage gradually pass out of existence and are replaced with smaller tugs of lighter tonnage. Tugs are taxed according to tonnage, so as tonnage decreases, fees drop accordingly.



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Showing Part of the Aquarium on Second Floor in the Erie Hatchery Building

### GREAT LAKES FISHERIES BOARD

On February 28, 1940 the Department of State of the United States announced that Secretary Hull and the Minister of Canada, Mr. Loring Christie, had signed an exchange of notes establishing a Board of Inquiry for the Great Lakes fisheries.

The board will make a study of the fisheries and submit recommendations as to methods of preserving and developing them.

In announcing the establishment of the board, the state department said:

"The problem of conserving the fisheries of the Great Lakes has long engaged the attention of the governments of Canada and the United States, the province of Ontario and the states bordering on the Great Lakes. The production of certain species of Great Lakes fish has reached low levels."

The board will hold a series of meetings at various points throughout the Great Lakes region to obtain full information and receive the opinions of commercial fishermen, sportsmen and other interested parties. The dates and places for these meetings will be announced later.

The President appointed as American members of this Board of Inquiry, Dr. John Van Oosten, Ann Arbor, Mich., in charge of the Great Lakes fisheries investigation for the U. S. Bureau of Fisheries, and Mr. Hubert R. Gallagher, Assistant Director of the Council of State Governments.

The Canadian members are Dr. A. G. Huntsman, Consulting Director of Fisheries Research Board of Canada and Mr. D. J. Taylor, Deputy Minister of the Department of Game and Fisheries, Province of Ontario.

### COMMENTS BY JOHN R. SCHADT

The Great Lakes Journal, which is a publication covering the activities of shipping, fishing, etc., has been interested in the work of this Board and it has turned over space in its magazine to those who are interested in the subject. It is well to quote herewith the fisherman's viewpoint by the use of the article which was furnished by Mr. John R. Schadt, who is President of the Great Lakes Fisheries Association. It is as follows:

"The primary purpose of these hearings will be to determine the advisability and practicability of the regulation of the Great Lakes fisheries by an International Commission, created by treaty between the United States and Canada. Other matters may be discussed and considered, but this will be the main issue. The question of straight Federal control is not at issue. Perhaps some commercial fishermen do not understand that straight Federal control is largely an academic question, impossible of accomplishment under present conditions. To bring about straight Federal control would require either an amendment to the Constitution of the United States, or the voluntary ceding, by all the States bordering on the Great Lakes, of their fishery rights to the Federal government; either of which is most unlikely to come to pass.

"Those advocating change of control fully realize that straight Federal control cannot be accomplished, so they are now concentrating on International control by treaty. If the present halibut treaty between the United States and Canada is any criterion, the contemplated International Commission would have absolute control over the Great Lakes fisheries. They, and they alone, would determine the kind and quantity of gear to be used, seasons, size of fish, quota of catch and licenses. They would designate which waters are to be fished and which waters are to be set aside as fish sanctuaries in which no fishing would be allowed. Licenses would undoubtedly be issued for different sections, restricting the holders of such licenses to fishing in definitely limited areas. In other words, this contemplated International Commission would have absolute autocratic power over the fisheries, and from their judgment there would be no appeal, and regulations adopted by them would supersede all State laws. We feel such absolute arbitrary power to be inimical to the best interests of the American commercial fishermen of the Great Lakes, and we are therefore opposed to it.

"All this agitation for International Control is based on the assumption that there is a serious depletion of the Great Lakes fisheries. This assumption we seriously dispute, but if the conservationists are correct in this assumption, there is but one solution possible and that is to curtail the production. Many of the Great Lakes commercial fisheries are

hardly getting by now; how could they possibly survive if production is curtailed? The commercial fisherman must never forget when he suggests regulations for the other fellow, he may be drastically regulated himself. With ultra-conservationists in control, as they undoubtedly would be in an International Commission, as proposed, no one would be immune. As we have repeatedly stated, if we once lose control over these fisheries, we will never be able to recover it. We should never barter away what we have for an unknown quantity, simply on the hope that we will get the best of the bargain.

"For a considerable time past there has been a subtle and persistent propaganda against the commercial fishermen. This is evidenced by articles that have appeared in magazines and newspapers denouncing the commercial fisherman and his activities.

"Speakers have appeared before Chambers of Commerce, and other bodies. These speakers have painted a sad picture of the depletion of the Great Lakes fisheries, and have left the impression that the Great Lakes fisheries are in a precarious condition, in fact that they are doomed, unless something drastic is done at once to save them. No one is there to refute them, so resolutions are introduced and passed, proposing new methods of control. In the State of Michigan the Junior Chambers of Commerce have held a whole series of conferences on the subject of depletion and control, all in the name of conservation.

"As a result of all this agitation the public have come to believe that the commercial fisherman is shamefully exploiting these fisheries for his own selfish ends. That he is a wanton destroyer of fish life. That if he had his way there would be no regulations at all, so he could fish with any device his heart desired, in all seasons, catch any size fish his fancy dictated, regardless of how such a course would effect the future supply.

"Now this is all most unfair to the commercial fisherman. Those who know him and come in contact with him fully realize that this conclusion is wholly unwarranted. There may be greedy, selfish fishermen, here and there, who disregard the future, but the great majority of the commercial fishermen of the Great Lakes are progressive in their ideas and are fully aware of the necessity of a continuing supply, if any fishery is to survive. They are amenable to reasonable regulation based on common sense and experience; they rightly oppose regulation dictated by conservation hysteria."

Several conferences were held during 1940, and the consensus of opinion among the commercial fishermen was that if the government put into effect the regulations they had in mind, it would probably force a great many of the fishermen out of business, and they set up a group to oppose any new regulations, representatives having been appointed operating out of the ports on the south shore of the lake.

NOTE: In the last Biennial Report a partial list of the Pennsylvania fishes as prepared by Dr. Fowler between the years 1928 and 1935 was included. The following is a complete list recorded from Pennsylvania and includes the work of Dr. Fowler up to and including the year 1939:

## A LIST OF THE FISHES RECORDED FROM PENNSYLVANIA

By HENRY W. FOWLER  
Curator of Fishes, The Academy of Natural Sciences  
of Philadelphia

In this work I have attempted to give a revised account of the fishes which I listed in 1912 and 1919. The plan used in those papers is largely followed here. The species are arranged with their principal drainage areas, and then according to the various counties in alphabetical sequence. The localities cited below in parentheses and following the county name, represent additional materials or records to any of those previously published since my last publication in these pages in 1938.

The materials listed below were largely, and in many cases entirely captured or secured by my son Henry W. Fowler Second. Similarly he assisted with most all my collecting in Pennsylvania from 1932 to 1935. Since the last named year they were secured as follows:

Tributary of the Neshaminy Creek east of Doylestown, Bucks County, May 10, 1936; Pidcock Creek at Bowman's Hill, Bucks County, May 3, 1936; Stony Brook and Coal Creek, York County, July 18, 1936; Promised Land Lake at Promised Land, Pike County, August 7 to 11, 1936, by Gordon Hill; Kelsey Creek, Wellsboro, Tioga County, August 11, 1936; Crooked Creek two miles above Tioga and Wilson Creek below Knapp, Tioga County, August 13, 1936; Neschronk Lake, Pike County, September 3, 1936; Sawkill Creek at Milford and Shoholo Pond, Pike County, September 4, 1936; tributary of Lackawaxen River near Rowland, Pike County, September 4, 1936; Yellow Breeches Creek at Brandtsville, Cumberland County, July 3, 1937; Tuscarora Creek a mile west of Port Royal, and Honey Grove, Juniata County, July 5, 1937; Stony Fork in the Susquehanna River basin, Tioga County, August 15, 1937; Crooked Creek near Tioga, Tioga County, August 16, 1937; tributary of Perkiomen Creek west of Perkasie, also its small tributary brook, Bucks County, September 6, 1937; Kreutz Creek near Stony Brook, York County, April 15, 1938, with Charles Spayd; Tohickon Creek near Kellers Church, Bucks County, July 4, 1938; Lumberville Creek near Carversville, Bucks County, September 4, 1938; West Branch of Christiana Creek in Delaware River basin south of West Grove, Chester County, September 6, 1938; Laurel Creek in Susquehanna River basin of Mifflin County, September 18, 1938, with Gordon Hill; small brook near Cresco and Canadensis in the Delaware River basin, Monroe County, October 8, 1938; Buckhill Creek and Indian Ladder Falls, Monroe County, October 9, 1938; tributary of Fishing Creek at Huntington Mills in the Susquehanna River basin near

New Columbus, and Coles Creek near Benton, July 3, 1939; Loyalsock Creek at Shady Nook, Sullivan County, July 4, 1939, with Mrs. Marie Miller; Tributary of Towanda Creek near Laddsburg and South Branch, Bradford County, July 5, 1939; headwater brook of Tioga River near Blossburg, Tioga County, July 5, 1939; Trout Run, Lycoming County, July 7, 1939; Lycoming Creek near Cogan, Lycoming County, July 7, 1939; Grape Run, tributary of the Susquehanna River in Clinton County, July 7, 1939

#### THE LAMPREYS (*Petromyzonidae*)

##### LAMPREY (*Petromyzon marinus*)

Delaware River basin in Berks, Bucks, Chester, Delaware, Northampton, Philadelphia, Pike and Wayne counties.

Susquehanna River basin in Bradford, Cameron, Dauphin, Lancaster, Mifflin, Northampton, Perry, Union and York counties.

##### ALLEGHENY BROOK LAMPREY (*Ichthyomyzon greeleyi*)

Ohio River basin in Erie, Indiana, Lawrence (New Wilmington and Newcastle—Raney 1939), McKean and Venango (Franklin—Raney 1939) counties. As *Ichthyomyzon concolor* in 1912 list.

##### AMERICAN BROOK LAMPREY (*Entosphenus lamottenii*)

Delaware River basin in Chester and Monroe counties.

Susquehanna River basin in Cameron and Perry counties.

Elk River basin in Chester county.

Ohio River basin in Allegheny, Indiana, McKean and Potter counties.

##### OHIO BROOK LAMPREY (*Lampetra aepyptera*)

Ohio River basin in McKean county.

#### THE SAND SHARKS (*Carchariidae*)

##### SAND SHARK (*Carcharias taurus*)

Delaware River tidal in Philadelphia county (accidental).

#### THE REQUEIM SHARKS (*Eulamiiidae*)

##### GROUND SHARK (*Eulamia plumbea*)

Delaware River tidal in Philadelphia county (accidental).

#### THE SKATES (*Rajidae*)

##### BIG SPOTTED SKATE (*Raja ocellata*)

Delaware River tidal in Philadelphia county (accidental).

#### THE STURGEONS (*Acipenseridae*)

##### STURGEON (*Acipenser oxyrinchus*)

Delaware River basin in Bucks, Delaware, Northampton and Philadelphia counties.

Susquehanna River basin in Dauphin, Lancaster and York counties.

##### LAKE STURGEON (*Acipenser fulvescens*)

Ohio River basin in Allegheny, Clarion, Indiana and Warren counties.

Lake Erie basin in Erie county.

##### SHORT-NOSED STURGEON (*Acipenser brevirostrum*)

Delaware River basin in Bucks and Philadelphia counties.

##### SHOVEL-NOSED STURGEON (*Scaphirhynchus platorynchus*)

Ohio River basin in Allegheny county.

#### THE PADDLE FISHES (*Polyodontidae*)

##### PADDLE FISH (*Polyodon spathula*)

Ohio River basin in Allegheny, Clarion, Indiana, McKean and Warren counties.

#### THE GAR PIKES (*Lepisosteidae*)

##### LONG-NOSED GAR PIKE (*Lepisosteus osseus*)

Delaware River basin in Bucks, Delaware, Chester, Monroe and Philadelphia counties.

Susquehanna River basin in Lancaster and York counties.

Ohio River basin in Clarion, Crawford, Indiana and Warren counties.

Lake Erie basin in Erie county.

##### SHORT-NOSED GAR PIKE (*Cylindrostomus platostomus*)

Ohio River basin in Allegheny county.

Lake Erie basin in Erie county.

#### BOWFINS (*Amiidae*)

##### BOWFIN (*Amia calva*)

Susquehanna River basin in Lancaster County (introduced?).

Ohio River basin in Allegheny county.

Lake Erie basin in Erie county.

#### MOONEYES (*Hiodontidae*)

##### GOLDEYE (*Amphiodon alvooides*)

Ohio River basin in Beaver and Youghiogheny Rivers.

##### MOONEYE (*Hiodon tergisus*)

Ohio River basin in Allegheny county.

Lake Erie basin in Erie county.

#### THE GIZZARD SHAD (*Dorosomidae*)

##### GIZZARD SHAD (*Dorosoma cepedianum*)

Delaware River basin in Bucks, Chester, Delaware and Philadelphia counties.

Ohio River basin in the Monongahela River.

#### THE HERRINGS (*Clupeidae*)

##### INLAND ALEWIFE (*Pomolobus chrysocloris*)

Ohio River basin in Allegheny, Blair and Indiana counties.

##### FALL HERRING (*Pomolobus mediocris*)

Delaware River basin in Bucks county.

##### ALEWIFE (*Pomolobus pseudo-harengus*)

Delaware River basin in Bucks, Delaware and Philadelphia counties.

Susquehanna River basin in Dauphin, Lackawanna, Lancaster, Luzerne, Perry and York counties.

##### SUMMER HERRING (*Pomolobus aestivalis*)

Delaware River basin in Bucks, Delaware and Chester counties.

##### SHAD (*Alosa sapidissima*)

Delaware River basin in Bucks, Chester, Delaware, Monroe, Northampton, Montgomery, Philadelphia, Pike and Wayne counties.

Susquehanna River basin in Bradford, Columbia, Dauphin, Lancaster, Luzerne, Northumberland, Perry, Wyoming and York counties.

##### MENHADEN (*Brevoortia tyrannus*)

Delaware River basin in Bucks and Delaware counties.

### THE WHITEFISHES (*Coregonidae*)

LAKE HURON HERRING (*Leucichthys artedi artedi*)

Lake Erie basin in Erie county.

LAKE ERIE HERRING (*Leucichthys artedi albus*)

Lake Erie basin in Erie county.

WHITEFISH (*Coregonus clupeaformis*)

Lake Erie basin in Erie county.

### THE SALMON (*Salmonidae*)

QUINNAT SALMON (*Oncorhynchus tshawytscha*)

Delaware River basin in Bucks and Philadelphia counties (introduced).

Susquehanna River basin in Northumberland county (introduced).

SALMON (*Salmo salar*)

Delaware River basin in Bucks, Delaware, Monroe, Northampton and Pike counties (introduced).

Susquehanna River basin (introduced).

LANDLOCKED SALMON (*Salmo salar sebago*)

Delaware River basin in Monroe, Pike and Wayne counties (introduced).

Susquehanna River basin in Luzerne county (introduced).

BROWN TROUT (*Salmo fario*)

Delaware River basin in Bucks, Monroe, Philadelphia, Pike and Wayne counties (introduced).

Susquehanna River basin in Blair, Cameron, Huntingdon, Luzerne, Tioga and Union counties (introduced).

COLUMBIA RIVER TROUT (*Salmo clarkii*)

Susquehanna River basin in Center and Susquehanna counties (introduced).

RAINBOW TROUT (*Salmo gairdneri irideus*)

Delaware River basin in Bucks, Montgomery, Pike, Wayne and Wyoming counties (introduced).

Susquehanna River basin in Center, Clearfield, Cumberland, Fayette and Franklin counties (introduced).

LAKE TROUT (*Cristivomer namaycush*)

Delaware River basin (introduced).

Susquehanna River basin (introduced).

Lake Erie basin in Erie county.

BROOK TROUT (*Salvelinus fontinalis fontinalis*)

Delaware River basin in Berks, Bucks, Carbon, Chester, Lackawanna, Lebanon, Lehigh, Monroe, Montgomery, Northampton, Philadelphia, Pike, Schuylkill and Wayne counties.

Susquehanna River basin in Berks, Blair, Bradford, Cameron, Center, Clearfield, Clinton, Columbia, Cumberland, Dauphin, Elk, Fulton, Huntingdon, Juniata, Lackawanna, Lancaster, Lebanon, Luzerne, Lycoming, Mifflin (Laurel Creek), Perry, Potter, Schuylkill, Somerset, Sullivan, Susquehanna, Tioga (Blossburg), Union, Wayne, Wyoming and York counties.

Potomac River basin in Adams, Franklin, Fulton and Somerset counties.

Genesee River basin in Potter county.

Ohio River basin in Erie, Fayette, Forest, Indiana, Lawrence, McKean, Potter, Somerset, Warren and Westmoreland counties.

Lake Erie basin in Erie county.

### THE GRAYLINGS (*Thymallidae*)

MICHIGAN GRAYLING (*Thymallus tricolor*)

Locality? (introduced).

### THE SMELETS (*Osmeridae*)

SOUTHERN SMELT (*Osmerus mordax sergeanti*)

Delaware River basin in Bucks, Delaware and Philadelphia counties.

### THE BULLHEADS (*Ameiuridae*)

BLUE CAT (*Ictalurus furcatus*)

Ohio River basin in the Monongahela River (Evermann and Bollman 1886).

SOUTHERN CHANNEL CAT (*Ictalurus lacustris punctatus*)

Ohio River basin in Allegheny, Beaver, Clarion, Indiana and Westmoreland counties.

Lake Erie basin in Erie county.

WHITE CAT (*Ameiurus catus*)

Delaware River basin in Bucks, Chester, Delaware and Philadelphia counties.

Susquehanna River basin in Cumberland, Lancaster and York counties.

YELLOW BULLHEAD (*Ameiurus natalis natalis*)

Ohio River basin in Allegheny and Crawford counties.

Lake Erie basin in Erie county.

BULLHEAD (*Ameiurus nebulosus nebulosus*)

Delaware River basin in Berks, Bucks (east of Doylestown), Carbon, Chester, Delaware, Lebanon, Monroe, Montgomery, Northampton, Pike (Promised Land Lake) and Wayne counties.

Susquehanna River basin in Adams, Bedford, Berks, Blair, Bradford, Cambria, Center, Chester, Clearfield, Clinton, Cumberland, Fulton, Juniata, Lackawanna, Lancaster, Lebanon, Luzerne, Lycoming, Mifflin, Montour, Northumberland, Perry, Snyder, Somerset, Sullivan (Shady Nook), Susquehanna, Tioga, Union, Wayne, Wyoming and York counties.

Northeast River basin in Chester county.

Potomac River basin in Franklin, Fulton and Somerset counties.

Genesee River basin in Potter county.

Ohio River basin in Armstrong, Beaver, Cambria, Clarion, Crawford, Indiana, Jefferson, Lawrence, McKean, Somerset, Venango, Warren and Westmoreland counties.

Lake Erie basin in Erie county.

BLACK BULLHEAD (*Ameiurus melas melas*)

Ohio River basin in the Kiskiminitas River.

Lake Erie basin in Erie county.

BLIND BULLHEAD (*Gronias nigrilabris*)

Susquehanna River basin in Lancaster county.

YELLOW CATFISH (*Pilodictis olivaris*)

Ohio River basin in the Youghiogheny River.

**STONE CAT (*Noturus flavus*)**

Ohio River basin in Pigeon Creek (Evermann and Bollman 1886) and Youghiogheny River; Erie (Mill Village—Raney and Lachner 1939), Indiana, McKean and Mercer (Delaware Grove—Raney and Lachner 1939) counties.

Genesee River basin in Potter county.

**TADPOLE CAT (*Schilbeodes gyrinus*)**

Delaware River basin in Bucks, Lehigh and Philadelphia counties.  
Genesee River basin in Potter county.

**MARGINED MADTOM (*Schilbeodes insignis*)**

Delaware River basin in Bucks (Pidcock Creek), Chester (West Grove), Lehigh, Monroe, Montgomery, Northampton, Philadelphia, Pike (Promised Land Lake) and Wayne counties.

Elk River basin in Chester county.

Susquehanna River basin in Adams, Blair, Bradford, Cameron, Center, Cumberland, Lancaster, Perry, Potter, Sullivan, Susquehanna and York counties.

**LONG-NOSED MADTOM (*Schilbeodes eleutherus*)**

Ohio River basin in Erie (Mill Village—Raney and Lachner 1939) and Mercer (Delaware Grove—Raney and Lachner 1939) counties.

**BRINDLED MADTOM (*Schilbeodes miurus*)**

Ohio River basin in Indiana county (McConnell 1905).

**THE MINNOWS (*Cyprinidae*)**

**CARP (*Cyprinus carpio*)**

Delaware River basin in Berks, Bucks, Carbon, Chester, Lehigh, Montgomery, Northampton and Philadelphia counties (introduced).

Susquehanna River basin in Adams, Blair, Bradford, Center, Clearfield, Columbia, Cumberland, Huntingdon, Lackawanna, Lancaster, Lebanon, Luzerne, Lycoming, Mifflin, Perry, Snyder, Susquehanna, Union and York counties (introduced).

Ohio River basin in Allegheny, Armstrong, Butler, Crawford, Greene, Indiana, Jefferson, Lawrence, Mercer, Somerset, Venango, Warren, Washington and Westmoreland counties (introduced).

Lake Erie basin in Erie county (introduced).

**GOLDFISH (*Carassius auratus*)**

Delaware River basin in Bucks, Lehigh and Philadelphia counties (introduced).

**RUDD (*Scardinius erythrophthalmus*)**

Delaware River basin in Philadelphia county (introduced).

**OHIO STONE ROLLER (*Campostoma anomalum anomalum*)**

Susquehanna River basin in Bradford (South Branch), Columbia, Tioga (Crooked Creek) and Union counties.

Ohio River basin in Allegheny, Beaver, Clarion, Indiana, Lawrence, McKean, Mercer (Delaware Grove—Raney and Lachner 1939) and Somerset counties.

**MISSISSIPPI STONE ROLLER (*Campostoma anomalum pullum*)**

Ohio River basin in Erie (Mill Village—Raney and Lachner 1939) and Lawrence (New Wilmington—Raney 1939) counties.

**FAT-HEAD MINNOW (*Pimephales promelas promelas*)**

Ohio River basin in McKean county.  
Lake Erie basin in Erie county.

**BLACK-HEADED MINNOW (*Hyborhynchus notatus*)**

Delaware River basin in Bucks (tributary of Perkiomen Creek and small brook), Lehigh and Montgomery counties.

Susquehanna River basin in Berks, Blair, Cameron, Cumberland, Dauphin, Lebanon, Snyder, Union and York counties.

Ohio River basin in Allegheny, Clarion, Erie (Mill Village—Raney and Lachner 1939), Indiana, Lawrence (New Wilmington—Raney 1939), McKean (Smethport—Raney 1939), Somerset and Westmoreland counties.

**BULLHEAD MINNOW (*Hypargyrus velox*)**

Ohio River basin in the Monongahela River (Evermann and Bollman 1886).

**CUT-LIPS (*Exoglossum maxillingua*)**

Delaware River basin in Berks, Bucks, Chester, Delaware and Montgomery counties.

Elk River basin in Chester county.

Susquehanna River basin in Berks, Blair, Cameron, Center, Columbia, Cumberland (Brandtsville), Dauphin, Franklin, Juniata (Port Royal), Lancaster, Lebanon, Luzerne, Perry, Snyder, Sullivan, Susquehanna, Tioga, Union and York (Kreutz Creek) counties.

**CHUB MINNOW (*Parexoglossum laurae*)**

Ohio River basin in Forest (Tionesta—Raney 1939) and McKean (Smethport—Raney 1939) counties.

**SCALLOPED MINNOW (*Ericymba buccata*)**

Potomac River basin in Franklin county.

Ohio River basin in Indiana, Somerset and Westmoreland counties.

**RED-BELLIED DACE (*Chrosomus erythrogaster*)**

Ohio River basin in the Kiskiminitas River (Fowler 1909), the Allegheny River (Cope 1869) and McKean county.

**EASTERN RED-BELLIED DACE (*Chrosomus erythrogaster eos*)**

Susquehanna River basin in Susquehanna county.

**SILVERY MINNOW (*Hybognathus nuchalis*)**

Ohio River basin in the Kiskiminitas River (Fowler 1907).

**EASTERN SILVERY MINNOW (*Hybognathus regius*)**

Delaware River basin in Bucks, Delaware and Philadelphia counties.

**ROACH (*Notemigonus crysoleucas crysoleucas*)**

Delaware River basin in Berks, Bucks (tributary of Perkiomen Creek and small brook), Chester, Delaware, Lebanon, Lehigh, Monroe, Montgomery, Northampton, Philadelphia and Pike (Promised Land Lake, Shohola Pond, Lackawaxen River) counties.

Susquehanna River basin in Cameron, Lackawanna, Lancaster, Mifflin, Sullivan, Susquehanna, Tioga (Crooked Creek near Tioga) and Union counties.

**WESTERN ROACH (*Notemigonus crysoleucas auratus*)**

Ohio River basin in Clarion, Elk and McKean counties.  
Lake Erie basin in Erie county.

RIVER SHINER (*Notropis blennius*)

Ohio River basin in the Monongahela River (as *Notropis jejunus* by Evermann and Bollman 1886).

SWALLOW MINNOW (*Notropis procne*)

Delaware River basin in Berks, Bucks, Chester, Delaware, Montgomery and Philadelphia counties.

Elk and Northeast River basins in Chester county.

Susquehanna River basin of Adams, Berks, Columbia, Dauphin, Lancaster, Lebanon, Snyder, Union and York counties.

NORTHERN BLACK-CHINNED SHINER (*Notropis heterolepis heterolepis*)  
Ohio River basin (Raney 1939)

MIMIC SHINER (*Notropis volucellus volucellus*)

Ohio River basin in Erie (Mill Village—Raney and Lachner 1939).

BIG-EYED SHINER (*Notropis boops*)

Ohio River basin in Clarion county.

ALLEGHENY BIG-MOUTHED SHINER (*Notropis dorsalis keimi*)

Ohio River basin in McKean county.

Genesee River basin in Potter county.

NORTHERN SAND SHINER (*Notropis deliciosus stramineus*)

Ohio River basin in the Monongahela River basin (Evermann and Bollman 1886), and Indiana and McKean counties.

Lake Erie basin in Erie county.

BRIDLED MINNOW (*Notropis bifrenatus*)

Delaware River basin in Berks, Bucks (tributary of Perkiomen Creek and small brook), Chester, Delaware, Lehigh, Montgomery, Northampton and Philadelphia counties.

Susquehanna River basin in Lancaster, Union and York counties.

BLACK-CHINNED SHINER (*Notropis heterodon*)

Ohio River basin (Raney 1939).

SPOT-TAIL SHINER (*Notropis hudsonius hudsonius*)

Ohio River basin in the Monongahela River basin (Evermann and Bollman 1886) and McKean county.

Lake Erie basin in Erie county.

EASTERN SPOT-TAIL SHINER (*Notropis hudsonius amarus*)

Delaware River basin in Bucks, Chester, Delaware, Lehigh, Montgomery, Philadelphia and Pike counties.

Susquehanna River basin in Centre, Columbia, Cumberland, Dauphin, Lancaster, Lebanon, Snyder, Union and York counties.

NORTHERN SILVER-FIN (*Notropis spilopterus*)

Ohio River basin in the Kiskiminitas and Youghiogheny Rivers and McKean county.

Lake Erie basin in Lake Erie.

SILVER-FIN (*Notropis analostanus*)

Delaware River basin in Berks, Bucks (Pidcock Creek, tributary of Perkiomen Creek and small brook), Carbon, Chester, Delaware, Lehigh, Montgomery, Philadelphia and Pike counties.

Elk River basin in Chester county.

Susquehanna River basin in Berks, Blair, Bradford, Columbia, Cumberland (Brandtsville), Dauphin, Huntington, Lancaster, Lebanon, Ly-

coming (Cogan), Mifflin, Perry, Snyder, Susquehanna, Tioga, Wyoming and York counties.

RED-FIN (*Notropis cornutus cornutus*)

Delaware River basin in Berks, Bucks (Kellers Church), Carbon, Chester, Delaware, Lehigh, Monroe, Montgomery, Northampton, Philadelphia and Pike counties.

Elk River basin in Chester county.

Susquehanna River basin in Adams, Bedford, Berks, Bradford (Laddsburg, South Branch), Cameron, Chester, Columbia, Cumberland (Brandtsville), Centre, Dauphin, Lancaster, Lebanon, Luzerne (Huntington Mills, New Columbus), Lycoming, Perry, Sullivan, Snyder, Susquehanna, Tioga, Union, Wyoming and York (Kreutz Creek) counties.

Genesee River basin in Potter county.

Ohio River basin in Clarion, Indiana, Lawrence, McKean and Warren counties.

Lake Erie basin in Erie county.

NORTHERN RED-FIN (*Notropis cornutus frontalis*)

Ohio River basin in McKean (Smethport—Raney 1939) county.

MISSISSIPPI RED-FIN (*Notropis cornutus chryscephalus*)

Ohio River basin in Erie (Mill Village—Raney and Lachner 1939) and Lawrence (New Wilmington—Raney 1939) counties.

IRON-COLORED SHINER (*Notropis chalybaeus*)

Delaware River basin in Bucks, Montgomery, Northampton and Philadelphia counties.

EMERALD SHINER (*Notropis atherinoides*)

Ohio River basin in the Monongahela River and Beaver River, and Indiana County.

Lake Erie basin in Erie county.

SOUTHERN EMERALD SHINER (*Notropis atherinoides dilectus*)

Ohio River basin (Raney 1939).

RED-FIN SHINER (*Notropis umbratilis cyanocephalus*)

Ohio River basin (Raney 1939).

RED-FACED SHINER (*Notropis rubellus*)

Ohio River basin Erie (Mill Village—Raney and Lachner 1939), Lawrence (New Wilmington—Raney 1939), and Mercer (Delaware Grove—Raney and Lachner 1939) counties.

SILVERY SHINER (*Notropis photogenis*)

Ohio River basin in the Youghiogheny River in Erie (Mill Village—Raney and Lachner 1939) and Indiana counties.

ATTRACTIVE SHINER (*Notropis amoenus*)

Delaware River basin in Bucks (Pidcock Creek), Monroe, Montgomery and Philadelphia counties.

Susquehanna River basin in Centre, Columbia, Dauphin, Lancaster, Lebanon, Perry, Snyder, Union and York counties.

SLENDER DACE (*Clinostomus elongatus*)

Ohio River basin in Crawford, Indiana, McKean and Somerset counties.

**ROSY-SIDED DACE (*Clinostomus vandoisulus*)**

Delaware River basin in Chester county.

Elk and Northeast River basins in Chester county.

Susquehanna River basin in Bradford (Laddsburg), Cameron, Chester, Lancaster and Tioga counties.

**PEARL DACE (*Margariscus margarita margarita*)**

Susquehanna River basin in Cameron, Centre, Lancaster and Union counties.

Ohio River basin in McKean county.

**FALL FISH (*Cheilonemus bullaris*)**

Delaware River basin in Berks, Bucks (Pidcock Creek), Chester, Delaware, Lehigh, Monroe, Montgomery, Northampton, Philadelphia, Pike (Promised Land Lake, Neschronk Lake) and Wayne counties.

Susquehanna River basin in Adams, Berks, Bradford, Cambria, Chester, Clinton, Cumberland, Huntingdon, Lancaster, Lycoming, Mifflin, Montour, Potter, Somerset, Union, Wayne and York counties.

Potomac River basin in Franklin and Somerset counties.

**CREEK CHUB (*Semotilus atromaculatus*)**

Delaware River basin in Berks, Bucks, Chester, Delaware, Lehigh, Monroe, Montgomery, Northampton, Philadelphia, Pike and Wayne counties.

Northeast River basin in Chester county.

Susquehanna River basin in Adams, Berks, Blair, Bradford (Laddsburg, South Branch), Cameron, Chester, Clinton, Columbia, Cumberland, Dauphin, Huntingdon, Juniata (Port Royal, Honey Grove), Lackawanna, Lancaster, Lebanon, Lycoming (Cogan), Mifflin, Montour, Perry, Potter, Snyder, Somerset, Sullivan, Tioga (Wellsboro, Crooked Creek, Wilson Creek, Stony Fork), Union, Wayne and York (Stony Brook, Coal Creek) counties.

Potomac River basin in Franklin and Somerset counties.

Ohio River basin in Allegheny, Armstrong, Cambria, Clarion, Fayette, Franklin, Indiana, Jefferson, McKean, Potter, Somerset, Warren and Westmoreland counties.

**LONG-NOSED DACE (*Rhinichthys cataractae*)**

Delaware River basin in Bucks, Carbon, Chester, Lehigh, Northampton and Pike counties.

Susquehanna River basin in Adams, Blair, Bradford (South Branch), Cameron, Centre, Columbia, Cumberland (Brandtsville), Dauphin, Lancaster, Lebanon, Luzerne (Huntington Mills), Perry, Snyder, Tioga (Wilson Creek), Union and York (Stony Brook, Coal Creek) counties.

Elk River basin in Chester county.

Ohio River basin in Fayette and Indiana counties.

**BLACK-NOSED DACE (*Rhinichthys atratulus atratulus*)**

Delaware River basin in Bucks (small brook emptying into a tributary of the Perkiomen Creek, Carversville), Carbon, Chester (West Grove), Delaware, Lehigh, Monroe (Canadensis, Bushkill Creek, Indian Ladder falls), Montgomery, Northampton, Philadelphia and Pike (Neschronk Lake, Sawkill Creek) counties.

Elk and Northeast River basins in Chester county.

Susquehanna River basin in Adams, Berks, Blair, Bradford (Laddsburg, South Branch), Cameron, Centre, Chester, Clinton (Grape Run),

Columbia, Cumberland (Brandtsville), Dauphin, Franklin, Huntingdon, Juniata (Port Royal, Honey Grove), Lackawanna, Lancaster, Lebanon, Luzerne (Huntington Mills, New Columbus, Benton), Lycoming (Trout Run, Cogan), Mifflin (Laurel Creek), Perry, Potter, Snyder, Sullivan, Susquehanna, Tioga (Wellsboro, Crooked Creek, Wilson Creek, Stony Fork, Blossburg), Union and York (Stony Brook, Coal Creek) counties.

Potomac River basin in Fulton county.

Genesee River basin in Potter county.

Ohio River basin in Beaver, Crawford, Fayette, Indiana, McKean, Potter, Somerset, Warren and Westmoreland counties.

**WESTERN BLACK-NOSED DACE (*Rhinichthys atratulus meleagris*)**

Ohio River basin (Raney 1939).

**SOUTHERN BLACK-NOSED DACE (*Rhinichthys atratulus obtusus*)**

Ohio River basin (Raney 1939).

**BIG-EYED CHUB (*Hybopsis amblops*)**

Ohio River basin (Raney 1939).

**SILVER CHUB (*Hybopsis storerianus*)**

Ohio River basin in the Monongahela River (Evermann and Bollman 1886).

**SPOTTED CHUB (*Erimystax dissimilis*)**

Susquehanna River basin in Centre (Ross 1905) county.

Ohio River basin in the Monongahela and Youghiogheny Rivers.

**CRESTED CHUB (*Noconis micropogon*)**

Elk River basin in Chester county.

Susquehanna River basin in Berks, Bradford, Cameron, Centre, Cumberland, Dauphin, Elk, Franklin, Lancaster, Lebanon, Luzerne, Lycoming (Cogan), Perry, Snyder, Susquehanna, Tioga, Union and York counties.

Potomac River basin in Cumberland county.

Ohio River basin in Erie (Mill Village—Raney and Lachner 1939), Indiana and Mercer (Delaware Grove—Raney and Lachner 1939) counties.

**HORNED CHUB (*Noconis biguttatus*)**

Genesee River basin in Potter county.

Ohio River basin in Beaver, Fayette, Indiana, Lawrence (New Wilmington—Raney 1939), McKean, Warren and Westmoreland counties.

**THE SUCKERS (*Catostomidae*)**

**CARP SUCKER (*Carpioles carpio*)**

Ohio River basin in Beaver county.

**QUILLBACK (*Carpioles velifer*)**

Ohio River basin in Allegheny (Rafinesque 1820) county, Monongahela River (Evermann and Bollman 1886) and Youghiogheny River.

**ROUGH-NOSED CARP SUCKER (*Carpioles cutisanserinus*)**

Ohio River basin in the Kiskiminitas River.

**EASTERN CARP SUCKER (*Carpioles cyprinus*)**

Susquehanna River basin in Lancaster, Union and York counties.

**LAKE CARP SUCKER (*Carpioles forbesi*)**

Lake Erie basin in Erie county.

**SMALL-MOUTH BUFFALO FISH (*Ictiobus bubalus*)**

Ohio River basin in Allegheny (Rafinesque 1818) county.

**BLACK-HORSE (*Cyclopterus elongatus*)**

Ohio River basin in Allegheny county, Allegheny River and Kiskiminetas River.

**WHITE-NOSED RED-HORSE (*Moxostoma anisurum*)**

Ohio River basin in Allegheny (Rafinesque 1820) and Mercer (McConnell 1905) counties, Youghiogheny (Cope 1870) and Beaver Rivers.

**LONG-TAILED RED-HORSE (*Moxostoma breviceps*)**

Ohio River basin in the Youghiogheny (Cope 1870) River.  
Lake Erie basin in Erie county.

**FINE-SCALE RED-HORSE (*Moxostoma duquesnii*)**

Ohio River basin in Allegheny (Le Sueur 1817), Indiana and Lawrence (New Wilmington—Raney 1939) counties, Youghiogheny (Cope 1870) and Beaver Rivers.

**GOLDEN RED-HORSE (*Moxostoma erythrurum*)**

Ohio River basin in Beaver, Indiana, McKean and Westmoreland counties.

Lake Erie basin in Erie county.

**LAKE RED-HORSE (*Moxostoma rubreques*)**

Ohio River basin in the Allegheny (Cope 1881?) River.

Lake Erie basin in Erie county.

**BIG-TOOTHED SUCKER (*Placopharynx carinatus*)**

Ohio River basin in the Youghiogheny (Günther 1868) and Beaver Rivers.

**SPOTTED SUCKER (*Minytrema melanops*)**

Susquehanna River basin in Centre (Ross 1905) county.  
Ohio River basin (Raney 1939).

**CHUB SUCKER (*Erimyzon oblongus*)**

Delaware River basin in Berks, Bucks (Pidcock Creek), Chester, Delaware, Lehigh, Monroe, Montgomery, Northampton, Philadelphia and Pike (Lackawaxen River) counties.

Susquehanna River basin in Blair, Cameron, Centre, Columbia, Cumberland, Dauphin, Lancaster, Mifflin, Sullivan (Shady Nook), Union and York counties.

Lake Erie basin in Erie county.

**BLACK SUCKER (*Hypentelium nigricans*)**

Delaware River basin in Lehigh county (introduced?).  
Elk River basin in Chester county.

Susquehanna River basin in Adams, Berks, Blair, Bradford (South Branch), Cameron, Chester, Cumberland (Brandtsville), Dauphin, Franklin, Lancaster, Lebanon, Mifflin, Perry, Snyder, Susquehanna, Tioga, Union and York (Kreutz Creek) counties.

Ohio River basin in Beaver, Clarion, Erie (Mill Village—Raney and Lachner 1939), Indiana, Lawrence, Mercer (Delaware Grove—Raney and Lachner 1939), Potter, Warren and Westmoreland counties.

**LONG-NOSED SUCKER (*Catostomus catostomus*)**

Ohio River basin in the Youghiogheny (Jordan 1878) River.

**SUCKER (*Catostomus commersonii commersonii*)**

Delaware River basin in Berks, Bucks, Carbon, Chester, Delaware, Lehigh, Monroe, Montgomery, Northampton, Philadelphia, Pike (Promised Land Lake) and Wayne counties.

North East River basin in Chester county.

Susquehanna River basin in Adams, Bedford, Berks, Blair, Bradford (Laddsburg, South Branch), Cameron, Centre, Chester, Clinton, Columbia, Cumberland (Brandtsville), Dauphin, Franklin, Fulton, Juniata (Honey Grove), Lackawanna, Lebanon, Lancaster, Luzerne (Huntington Mills, New Columbus), Lycoming, Mifflin, Perry, Snyder, Sullivan (Shady Nook), Susquehanna, Tioga (Crooked Creek near Tioga), Union, Wyoming and York (Stony Brook, Coal Creek) counties.

Potomac River basin in Franklin and Fulton counties.

Genesee River basin in Potter county.

Ohio River basin in Armstrong, Beaver, Cambria, Clarion, Fayette, Forest, Indiana, McKean, Somerset, Venango, Warren and Westmoreland counties.

Lake Erie basin in Erie county.

**THE EELS (*Anguillidae*)**

**EEL (*Anguilla bostoniensis*)**

Delaware River basin in Berks, Bucks, Carbon, Chester, Delaware, Lehigh, Monroe, Montgomery, Northampton, Philadelphia, Pike (Neschronk Lake) and Wayne counties.

Susquehanna River basin in Bedford, Berks, Blair, Bradford, Cameron, Clearfield, Clinton, Huntingdon, Lackawanna, Lancaster, Luzerne, Lycoming, Mifflin, Montour, Perry, Potter, Sullivan, Susquehanna, Wyoming and York counties.

Potomac River basin in Somerset county.

Genesee River basin in Potter county.

Ohio River basin in Allegheny, Cambria, Clarion, Indiana, Potter, Somerset and Warren counties.

Lake Erie basin in Erie county.

**THE PIKES (*Esocidae*)**

**BANDED PICKEREL (*Esox americanus*)**

Delaware River basin in Berks, Bucks, Carbon, Chester, Delaware, Lehigh, Monroe, Montgomery, Northampton, Philadelphia and Pike (Promised Land Lake) counties.

Susquehanna River basin in Berks, Blair, Chester, Columbia, Cumberland, Elk, Fulton, Huntingdon, Lancaster, Luzerne, Lycoming, Montour, Northumberland, Perry, Susquehanna, Union and York counties.

**WESTERN PICKEREL (*Esox vermiculatus*)**

Ohio River basin in Armstrong, Clarion, Crawford, Elk, Indiana, McKean, Mercer, Potter and Venango counties.

**CHAIN PICKEREL (*Esox niger*)**

Delaware River basin in Bucks, Carbon, Lehigh, Monroe, Philadelphia, Pike (Promised Land Lake, Neschronk Lake) and Wayne counties.

Susquehanna River basin in Bradford, Centre, Clearfield, Clinton, Cumberland, Lackawanna, Lebanon, Luzerne, Sullivan (Shady Nook), Susquehanna, Union and Wyoming counties.

Lake Erie basin (introduced).

NORTHERN PIKE (*Esox lucius*)

Ohio River basin in Clarion, Crawford, Indiana, Mercer, McKean, Warren and Westmoreland counties.

Lake Erie basin in Erie county.

MUSKELLUNGE (*Esox masquinongy masquinongy*)

Delaware River basin in Wayne county (introduced).

Lake Erie basin in Erie county.

OHIO MUSKELLUNGE (*Esox masquinongy ohioensis*)

Ohio River basin in Beaver, Clarion, Crawford and Warren counties.

#### THE MUD MINNOWS (*Umbridae*)

MUD MINNOW (*Umbrina pygmaea*)

Delaware River basin in Bucks, Delaware and Philadelphia counties.

WESTERN MUD MINNOW (*Umbrina limi*)

Ohio River basin in Crawford county.

#### THE KILLIFISHES (*Cyprinodontidae*)

MUMMICHOG (*Fundulus heteroclitus macrolepidotus*)

Delaware River basin in Bucks, Delaware and Philadelphia counties.

Ohio River basin (Raney 1939, introduced).

BARRED KILLIFISH (*Fundulus diaphanus diaphanus*)

Delaware River basin in Berks, Bucks (Pidcock Creek, small brook emptying into a tributary of the Perkiomen Creek, Tohickon Creek near Kellers Church), Chester, Delaware, Lehigh, Montogomery, Northampton and Philadelphia counties.

Susquehanna River basin in Berks, Centre, Columbia, Dauphin, Lancaster, Lebanon, Snyder, Susquehanna and York counties.

Potomac River basin in Franklin county.

Ohio River basin (Raney 1939, introduced).

MENONA KILLIFISH (*Fundulus diaphanus menona*)

Ohio River basin in Warren county.

Lake Erie basin in Erie county.

#### THE TOP MINNOWS (*Poeciliidae*)

TOP MINNOW (*Gambusia holbrookii*)

Delaware River basin in Delaware county (introduced from Cape May, N. J.).

#### THE BILL FISHES (*Belonidae*)

GREEN GAR (*Strongylura marina*)

Delaware River basin in Bucks, Delaware and Philadelphia counties.

Susquehanna River basin in Lancaster and York counties.

HOUNDFISH (*Strongylura acus*)

Susquehanna River basin in the lower Susquehanna River.

#### THE CODS (*Gadidae*)

BURBOT (*Lota maculosa*)

Delaware River basin in Bucks county (introduced).

Susquehanna River basin in Dauphin and Lycoming counties (introduced).

Lake Erie basin in Erie county.

#### THE SOLES (*Achiridae*)

SOLE (*Achirus fasciatus*)

Delaware River basin in Bucks and Philadelphia counties.

#### THE SILVERSIDES (*Atherinidae*)

BROOK SILVERSIDES (*Labidesthes sicculus sicculus*)

Ohio River basin in the Youghiogheny River.

Lake Erie basin in Erie county.

#### THE TROUT PERCHES (*Percopsidae*)

TROUT PERCH (*Percopsis omiscomaycus*)

Delaware River basin in Lehigh county.

Ohio River basin in the Monongahela River (Evermann and Bollman 1886) and Mercer county (McConnell 1905).

#### THE STICKLEBACKS (*Gasterosteidae*)

BROOK STICKLEBACK (*Eucalia inconstans*)

Ohio River basin in Clarion county.

TWO-SPINED STICKLEBACK (*Gasterosteus aculeatus*)

Delaware River basin in Philadelphia county.

THREE-SPINED STICKLEBACK (*Apeltes quadratus*)

Delaware River basin in Bucks, Delaware, Lehigh, Northampton and Philadelphia counties.

#### THE BLUE FISHES (*Pomatomidae*)

BLUE FISH (*Pomatomus saltatrix*)

Delaware River basin in Philadelphia county (accidental).

#### THE PIRATE PERCHES (*Aphredoderidae*)

PIRATE PERCH (*Aphredoderus sayanus*)

Delaware River basin in Bucks, Delaware and Philadelphia counties.

#### THE SUNFISHES (*Centrarchidae*)

WHITE CRAPPIE (*Pomoxis annularis*)

Delaware River basin (introduced).

Susquehanna River basin (introduced).

Ohio River in the Monongahela and Kiskiminitas Rivers.

BLACK CRAPPIE (*Pomoxis sparoides*)

Delaware River basin in Bucks, Delaware, Monroe, Montgomery, Northampton, Philadelphia and Pike counties.

Susquehanna River basin in Lancaster and York counties.

Ohio River basin in Clarion county.

Lake Erie basin in Erie county.

**RED-EYED BASS (*Ambloplites rupestris*)**

Delaware River basin in Philadelphia county (introduced).  
Susquehanna River basin in Cumberland, Juniata (Port Royal) and Tioga (Crooked Creek) counties.  
Potomac River in Franklin county.  
Genesee River basin in Potter county.  
Ohio River basin in Beaver, Clarion, Crawford, Fayette, Indiana, Lawrence, McKean, Warren and Westmoreland counties.  
Lake Erie basin in Erie county.

**MUD SUNFISH (*Acantharchus pomotis*)**

Delaware River basin in Bucks (Fowler 1938) county.

**WARMOUTH (*Chaenobryttus gulosus*)**

Delaware River basin (introduced).  
Susquehanna River basin (introduced).  
Ohio River basin (Raney 1939).

**SPHAGNUM SUNFISH (*Enneacanthus obesus*)**

Delaware River basin in Bucks and Philadelphia counties.

**BLUE-SPOTTED SUNFISH (*Enneacanthus gloriosus*)**

Delaware River basin in Bucks, Delaware, Philadelphia and Pike (Promised Land Lake) counties.

**BANDED SUNFISH (*Mesogonistius chaetodon*)**

Delaware River basin in Bucks and Philadelphia counties.

**GREEN SUNFISH (*Apomotis cyanellus*)**

Ohio River basin in Allegheny county.  
Lake Erie basin in Erie county.

**RED-BELLIED SUNFISH (*Lepomis auritus*)**

Delaware River basin in Berks, Bucks (small brook emptying into a tributary of Perkiomen Creek, Tohickon Creek at Kellers Church), Chester, Delaware, Lehigh, Montgomery, Northampton, Philadelphia, Pike (Promised Land Lake) and Wayne counties.  
Elk River basin in Chester county.

Susquehanna River basin in Adams, Berks, Centre, Cumberland, Dauphin, Juniata (Honey Grove), Lancaster, Lebanon, Snyder, Sullivan and York counties.

**BLUE SUNFISH (*Helioperca macrochira*)**

Delaware River basin in Bucks, Lehigh, Pike and Philadelphia counties (introduced).

Ohio River basin in Warren county and Kiskiminitas River.  
Lake Erie basin in Erie county.

**SOUTHERN LONG-EARED SUNFISH (*Xenotis megalotis megalotis*)**

Ohio River basin in the Kiskiminitas River.

**NORTHERN LONG-EARED SUNFISH (*Xenotis megalotis peltastes*)**

Ohio River basin (Raney 1939).

**SUNFISH (*Eupomotis gibbosus*)**

Delaware River basin in Berks, Bucks (east of Doylestown), Carbon, Chester, Delaware, Lehigh, Monroe, Montgomery, Northampton, Philadelphia, Pike (Promised Land Lake, Shohola Pond) and Wayne counties.

Susquehanna River basin in Adams, Berks, Blair, Bradford, Cambria, Clinton, Centre, Columbia, Dauphin, Cumberland, Franklin, Fulton, Huntingdon, Lackawanna, Lancaster, Lebanon, Luzerne, Mifflin, Montour, Northumberland, Perry, Sullivan, Susquehanna, Tioga, Wyoming and York (Coal Creek) counties.

Potomac River basin in Fulton county.

Ohio River basin in Clarion, Franklin, Indiana and McKean counties.  
Lake Erie basin in Erie county.

**SMALL-MOUTHED BASS (*Micropterus dolomieu*)**

Delaware River basin in Chester county (introduced).

Susquehanna River basin in Cumberland (Brandtsville), Lycoming (Cogan) and Tioga counties (introduced).

Potomac River basin in Fulton county (introduced).

Ohio River basin in Allegheny, Armstrong, Beaver, Butler, Cambria, Clarion, Clearfield, Crawford, Erie, Fayette, Forest, Indiana, Lawrence (New Wilmington—Raney 1939), McKean, Mercer, Somerset, Venango and Warren counties.

Lake Erie basin in Erie county.

**LARGE-MOUTHED BASS (*Huro salmoides*)**

Delaware River basin in Bucks, Chester, Delaware, Lehigh, Monroe, Montgomery, Northampton, Philadelphia, Pike and Wayne counties (introduced).

Potomac River basin (introduced).

Ohio River basin in Crawford, Indiana, McKean and Warren counties.

Lake Erie basin in Erie county.

**THE PERCHES (Percidae)**

**YELLOW PIKE PERCH (*Stizostedion vitreum*)**

Delaware River basin in Bucks county (introduced).

Susquehanna River basin in Lancaster and York counties (introduced).

Genesee River basin in Potter county.

Ohio River basin in Allegheny, Beaver, Butler, Cambria, Clarion, Crawford, Forest, Indiana, Lawrence, McKean, Warren and Westmoreland counties.

Lake Erie basin in Erie county.

**BLUE PIKE PERCH (*Stizostedion glaucus*)**

Lake Erie basin in Erie county.

**SAUGER (*Stizostedion canadense*)**

Ohio River basin in Indiana and Warren counties, and the Beaver and Youghiogheny Rivers.

Lake Erie basin in Erie county.

**YELLOW PERCH (*Perca flavescens*)**

Delaware River basin in Bucks, Carbon, Delaware, Lehigh, Monroe, Montgomery, Philadelphia, Pike (Promised Land Lake) and Wayne counties.

Susquehanna River basin in Bradford, Lackawanna, Lancaster, Luzerne, Mifflin, Wyoming and York counties.

Ohio River basin in Crawford county (introduced).  
Lake Erie basin in Erie county.

**LOG PERCH** (*Percina caprodes*)

Susquehanna River basin in Lancaster county.  
Ohio River basin in Crawford and McKean counties.  
Lake Erie basin in Erie county.

**GILT DARTER** (*Hadropodus evides*)

Ohio River basin (Raney 1939).

**SLENDER-HEADED DARTER** (*Hadropodus phoxocephalus*)

Ohio River basin in the Monongahela River (Evermann and Bollman 1886).

**LONG-HEADED DARTER** (*Hadropodus macrocephalus*)

Ohio River basin in Clarion county, French Creek (Bean 1892) and Youghiogheny River.

**SHIELDED DARTER** (*Hadropodus peltatus*)

Delaware River basin in Montgomery and Pike counties.  
Susquehanna River basin in Berks, Dauphin, Lancaster and Snyder counties.

**BLACK-SIDED DARTER** (*Hadropodus maculatus*)

Ohio River basin in Indiana county.

**GREEN-SIDED DARTER** (*Etheostoma blennioides*)

Ohio River basin in Clarion, Erie (Mill Village—Raney and Lachner 1939) and Mercer (Delaware Grove—Raney and Lachner 1939) counties. Also in the Beaver, Kiskiminitas and Monongahela Rivers.

**JOHNNY DARTER** (*Boleosoma nigrum nigrum*)

Ohio River basin in Allegheny, Crawford (Venango—Raney and Lachner 1939), Clarion, Indiana, McKean and Mercer (Delaware Grove and Carlton—Raney and Lachner 1939) and McKean counties.

**TESSELLATED DARTER** (*Boleosoma nigrum olmstedi*)

Delaware River basin in Berks, Bucks (Carversville, Kellers Church, Pidcock Creek), Carbon, Chester, Delaware, Lehigh, Monroe, Montgomery, Northampton, Philadelphia and Pike counties.  
Elk River basin in Chester county.

Susquehanna River basin in Adams, Berks, Blair, Bradford, Cameron, Centre, Columbia, Cumberland (Brandtsville), Dauphin, Huntingdon, Juniata (Honey Brook, Port Royal), Lancaster, Luzerne (Huntington Mills, New Columbus), Lycoming (Cogan), Mifflin, Perry, Snyder, Sullivan, Susquehanna, Tioga (Crooked Creek) and York (Kreutz Creek) counties.

**SAND DARTER** (*Ammocrypta pellucida pellucida*)

Ohio River basin in the Youghiogheny and Monongahela Rivers.  
Lake Erie basin in Erie county.

**VARIEGATED DARTER** (*Poecilichthys variatus*)

Ohio River basin in Allegheny, Clarion, Erie (Mill Village—Raney and Lachner 1939), Mercer (Delaware Grove—Raney and Lachner 1939) and Venango (McConnell 1905) counties, also the Monongahela River (Evermann and Bollman 1886).

**ZONED DARTER** (*Poecilichthys zonalis*)

Ohio River basin in Mercer (Delaware Grove—Raney and Lachner 1939) county, and Monongahela River (Evermann and Bollman 1886).

Lake Erie basin in Erie (Mill Village—Raney and Lachner 1939) county.

**SPOTTED DARTER** (*Poecilichthys maculatus*)

Ohio River basin in Crawford (Venango—Raney and Lachner 1939), Erie (Mill Village—Raney and Lachner 1939) and Mercer (Carlton and Delaware Grove—Raney and Lachner 1939, Jamestown—McConnell 1905) counties.

**BLUE DARTER** (*Poecilichthys caeruleus*)

Ohio River basin in Erie (Mill Village—Raney and Lachner 1939) and Mercer (Carlton and Delaware Grove—Raney and Lachner 1939) counties, also Kiskiminitas River, and Monongahela River (Evermann and Bollman 1886).

**BLUE-BREASTED DARTER** (*Poecilichthys camurus*)

Ohio River basin in Erie (Mill Village—Raney and Lachner 1939) county.

**TIPPECANOE DARTER** (*Poecilichthys tippecanoe*)

Ohio River basin in Crawford (Venango—Raney and Lachner 1939) and Mercer (Carlton—Raney and Lachner 1939) counties.

**FAN-TAILED DARTER** (*Catotomus flabellaris flabellaris*)

Susquehanna River basin in Cumberland and Perry counties.  
Potomac River basin in Franklin county.

Ohio River basin in Allegheny, Crawford, Erie (Mill Village—Raney and Lachner 1939), Mercer (Delaware Grove—Raney and Lachner 1939) and McKean (Smethport—Raney 1939) and Westmoreland counties.

**LOWLAND DARTER** (*Hololepis erochrous*)

Delaware River basin in Bucks county.

**THE SEA BASSES (Serranidae)**

**WHITE BASS** (*Lepibrama chrysops*)

Delaware River basin in Pike (Bruce, Silver Lakes) and Wayne (Beech Lake) counties (introduced).

Genesee River basin in Potter county.

Ohio River basin in Clarion, Indiana, Mercer and Warren counties.  
Lake Erie basin in Erie county.

**STRIPED BASS** (*Roccus saxatilis*)

Delaware River basin in Bucks, Chester, Delaware, Montgomery, Philadelphia and Pike counties.

Susquehanna River basin in Dauphin, Lancaster, Luzerne and York counties.

**YELLOW BASS** (*Chrysoperca interrupta*)

Delaware River basin (introduced).

**WHITE PERCH** (*Morone americana*)

Delaware River basin in Bucks, Carbon, Delaware, Montgomery, Northampton and Philadelphia counties.

Susquehanna River basin in Lancaster and York counties.

#### THE CROAKERS (*Sciaenidae*)

##### FRESH-WATER DRUM (*Aplodinotus grunniens*)

Ohio River basin in Indiana county, the Allegheny and Monongahela Rivers.

Lake Erie basin in Erie county.

#### THE SCULPINS (*Cottidae*)

##### WESTERN SCULPIN (*Cottus bairdii bairdii*)

Genesee River basin in Potter county.

Ohio River basin in Allegheny, Clarion, Crawford, Indiana, McKean, Somerset and Westmoreland counties.

##### SCULPIN (*Cottus gracilis*)

Delaware River basin in Berks, Bucks, Carbon, Chester, Lehigh, Montgomery and Northampton counties.

Elk River basin in Chester county.

Susquehanna River basin in Berks, Centre, Columbia, Cumberland, Dauphin, Huntingdon, Lancaster, Luzerne (Benton), Lycoming (Trout Run), Mifflin (Laurel Run), Perry, Snyder and Tioga counties.

#### BIBLIOGRAPHY

My paper entitled *Notes on Pennsylvania Fishes* gives a clue to the previous literature dealing with Pennsylvania fishes.<sup>1</sup> Several papers noticed below have appeared subsequently relating to the western part of the State, and announce additional species.

##### EDWARD COWDEN RANEY

1939. The Distribution of the Fishes of the Ohio drainage basin of Western Pennsylvania. Cornell University Abstracts of Theses, 1939, pp. 273 to 277. A list of 117 species and subspecies without localities.

The breeding habits of *Ichthyomyzon greeleyi* Hubbs and Trautman. Copeia, 1939, no. 2, July 12, pp. 111 and 112.

Observations of the nesting habits of *Parexoglossum laurae* Hubbs and Trautman. Copeia, 1939, no. 2, July 12, pp. 112 and 113.

##### EDWARD C. RANEY AND ERNEST A. LACHNER

1939. Observations on the Life History of the Spotted Darter, *Poeciliichthys maculatus* (Kirkland). Copeia, 1939, no. 3, Sep. 9, pp. 157 to 165. Includes notes on the fishes of the Shenango River, Allegheny River and French Creek, in northwestern Pennsylvania.

<sup>1</sup> Report of the Board of Fish Commissioners for the period ending May 31, 1938, pp. 101 to 108.

#### EDUCATION AND PUBLICITY

The "Pennsylvania Angler," the Press, and the Capitol News have been the Board's medium of education and publicity. Many news releases have been made, with a wide distribution through the papers of the Commonwealth.

Through the "Angler" it has been possible to launch some real conservation measures, some of the most important being:

The education of fishermen to the use of artificial flies and lures.

The Plant a Willow Program.

The formation of Junior Conservation Groups.

Campaign on the Water Snake.

The "Angler" has an ever increasing subscription list. However, it should be in the hands of every fisherman, and we urge all groups to do what they can, either by sale to their various members, or by including it in the annual dues. It is your magazine and we request your support. The subscription price is fifty cents (50c) per year and in groups of ten or more a liberal discount is given, which is available to organizations and other groups interested in conservation. Sample copies and subscription blanks will be gladly mailed.

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#### ACKNOWLEDGMENTS

We wish to pay tribute to all Sportsmen's Groups who have so faithfully cooperated with the Fish Commission. They have always been ready and willing to assist in the distribution of fish, and have been instrumental in establishing Junior Conservation Chapters in every section of the Commonwealth.

The Press has been most liberal with publicity and without it we would have been unable to formulate our program. The Board expresses its deep appreciation for this service.

The Board also extends its thanks to the ever faithful employes in the office and field and for the outstanding and business-like manner in which they have conducted the affairs of the Commission.

**FINANCIAL STATEMENTS  
CHARTS  
AND  
STATISTICS**

**PERIOD  
ENDING MAY 31, 1940**

**(Charts complete for calendar year 1940)**

#### TO THE STOCKHOLDERS:

Have you given much thought to the set-up of your Commission? What it does for you—how it operates—and above all—how your license money is expended.

The \$1.50 you pay for a license is not a tax. It is a contribution towards maintaining the industry of which you are a stockholder. Those who don't fish have no part in its maintenance. So often the average taxpayer believes his money is helping to operate a branch of the State Government in which he personally has no interest. The slogan here is—"If you don't fish, you don't pay."

During 1940 the Fisherman's Dollar was expended as follows:—

Hatching, Propagation and Distribution of Fish .....	57.35
Salaries and Expenses of Wardens .....	15.43
New Construction .....	12.30
Administration .....	5.88
Research, Boat Patrol, Purchase of Land and Waters, Stores Acct., Legal, Refunded Fines .....	3.21
Publicity .....	3.16
Dept. of Revenue, Dept. of State-Insurance .....	2.67

Hatching, propagating and distribution constitute the major function of the Board of Fish Commissioners. During 1940, fifty-seven cents (57c) of every dollar of your money was expended for this purpose. Under our present program of distribution, only major waters are stocked. Several years ago a survey of waters was made, and fish are now distributed with our own personnel and equipment, with the assistance of the local fishermen.

During 1940—1,393,330 legal sized brook, brown and rainbow trout were distributed. In addition to this the warm water streams received 548,988 black bass 1" to 14"; 326,770 bream 2" to 8"; and 498,793 catfish 3" to 11½". There were also distributed 2,560,000 fingerling trout and several hundred million yellow perch, pike perch, etc.

The present program of the Board points toward a larger distribution of bream, catfish, pike perch and yellow perch of a size where they are able to care for themselves. Real progress has been made and with the program as outlined there will be considerably more of the dollar going into the production of fish for your favorite waters.

As hatching and propagation is the major function of the Board, we believe every fisherman owes it to himself to visit one of the hatch-

eries. They can be reached on main highway routes, maps being available at Harrisburg, giving location, and species of fish propagated. Make a special effort to visit our Spring Creek Project at Bellefonte, Centre County! This is an excellent fishing stream and shows what intelligent stream improvement will do. The records each year show visitors from every state in the Union. The principal hatchery is also located at this point. The Huntsdale Hatchery will very shortly be equal in size to any we now have in operation and all species of fish will be propagated. It has grown from a plant of forty-six wooden ponds to two hundred and fifty concrete and extent of operations is almost a mile along the Yellow Breeches Creek.

The following statement gives you a picture of the gross income and expenditures of the Board of Fish Commissioners for the years 1939 and 1940:

THE GROSS INCOME OF THE BOARD OF FISH COMMISSIONERS  
FOR 1940 WAS \$646,011.34  
WHERE IT CAME FROM

	In 1940	In 1939	Increase or Decrease Over 1939
Fish law fines .....	\$9,388.50	\$14,167.68	-\$4,779.18
Commercial hatchery licenses .....	955.00	1,020.00	-65.00
Seine licenses (tidewater) .....	10.00	10.00	-
Motor boat fines .....	150.00	210.00	-60.00
Lake Erie licenses .....	2,787.00	2,985.00	-198.00
Non-resident and tourist fishing licenses .....	20,451.30	18,652.14	+1,799.16
Interest .....	5,788.37	3,065.30	+2,723.07
Resident fishing licenses .....	576,346.60	596,082.11	-19,735.51
Motor boat licenses .....	13,492.50	11,473.75	+2,018.75
Sale of publications .....	3,768.28	4,314.58	-546.30
Contributions .....	11,877.75	10,422.25	+1,455.50
Eel chute licenses .....	126.00	179.00	-53.00
Sale of unserviceable property .....	532.24	108.01	+424.23
Miscellaneous .....	337.80	9.49	+328.31
<b>Totals .....</b>	<b>\$646,011.34</b>	<b>\$662,699.31</b>	<b>-\$16,687.97</b>

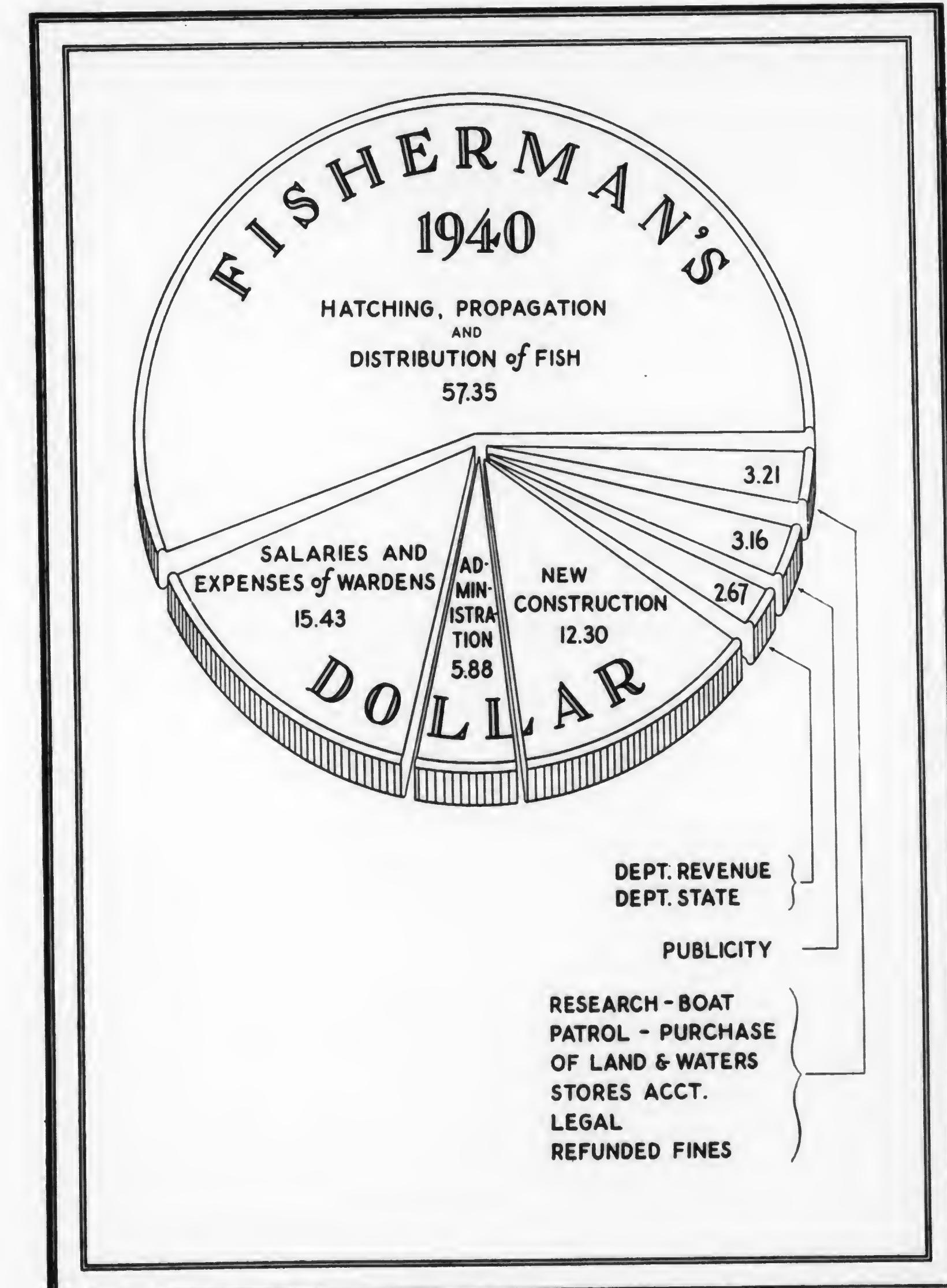
WHERE IT WENT

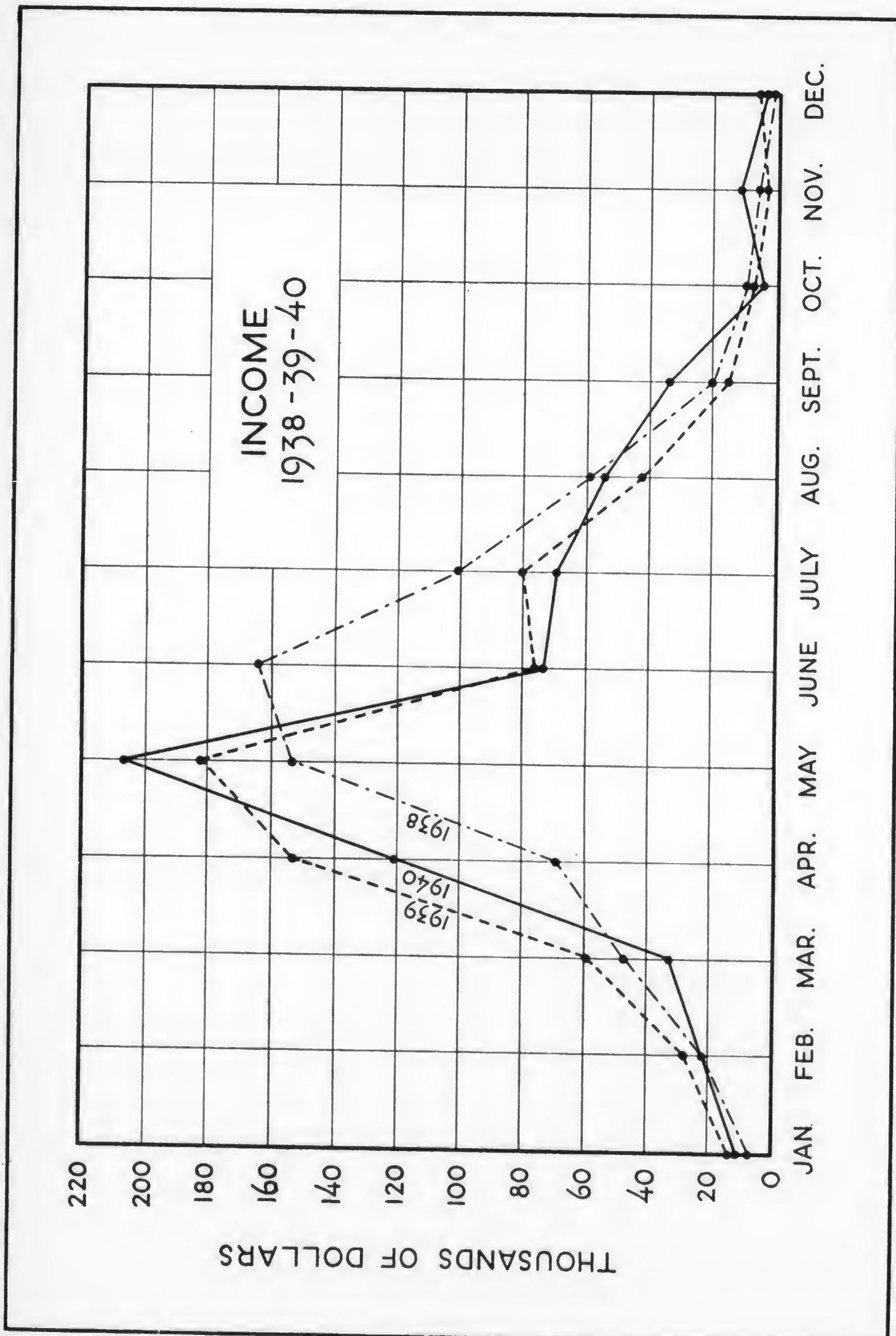
	In 1940	In 1939	Increase or Decrease Over 1939
Salaries—Administrative office .....	\$21,780.00	\$21,592.67	+\$187.33
Hatching and propagating .....	327,227.48	284,050.99	+43,176.49
Commissioners' expenses .....	2,972.12	4,575.57	-1,603.45
Legal expenses .....	450.00	919.40	-469.40
Salaries and expenses of wardens .....	100,228.27	104,181.88	-3,953.61
Office expenses .....	10,084.69	11,868.11	-1,783.42
Boat patrol .....	35.51	56.99	-21.48
Purchase of land .....	8,375.00	3,288.00	+5,087.00
Field work .....	45,294.48	51,875.32	-6,580.84
Buildings and ponds .....	79,892.73	36,491.50	+43,401.23
Publicity .....	23,288.98	21,854.01	+1,434.97
Refunded fines .....	200.00	25.00	+175.00
Printing .....	3,321.06	2,443.41	+877.65
State Department—Retirement Board	2,535.00	2,447.50	+87.50
Department of Revenue .....	14,830.54	17,920.83	-3,090.29
Storage .....	9,012.69	—	+9,012.69
<b>Totals .....</b>	<b>\$649,528.55</b>	<b>\$563,591.18</b>	<b>+\$85,937.37</b>

The above figures show the sources and distribution of the income for 1940 and 1939.

+ Increase out of surplus.

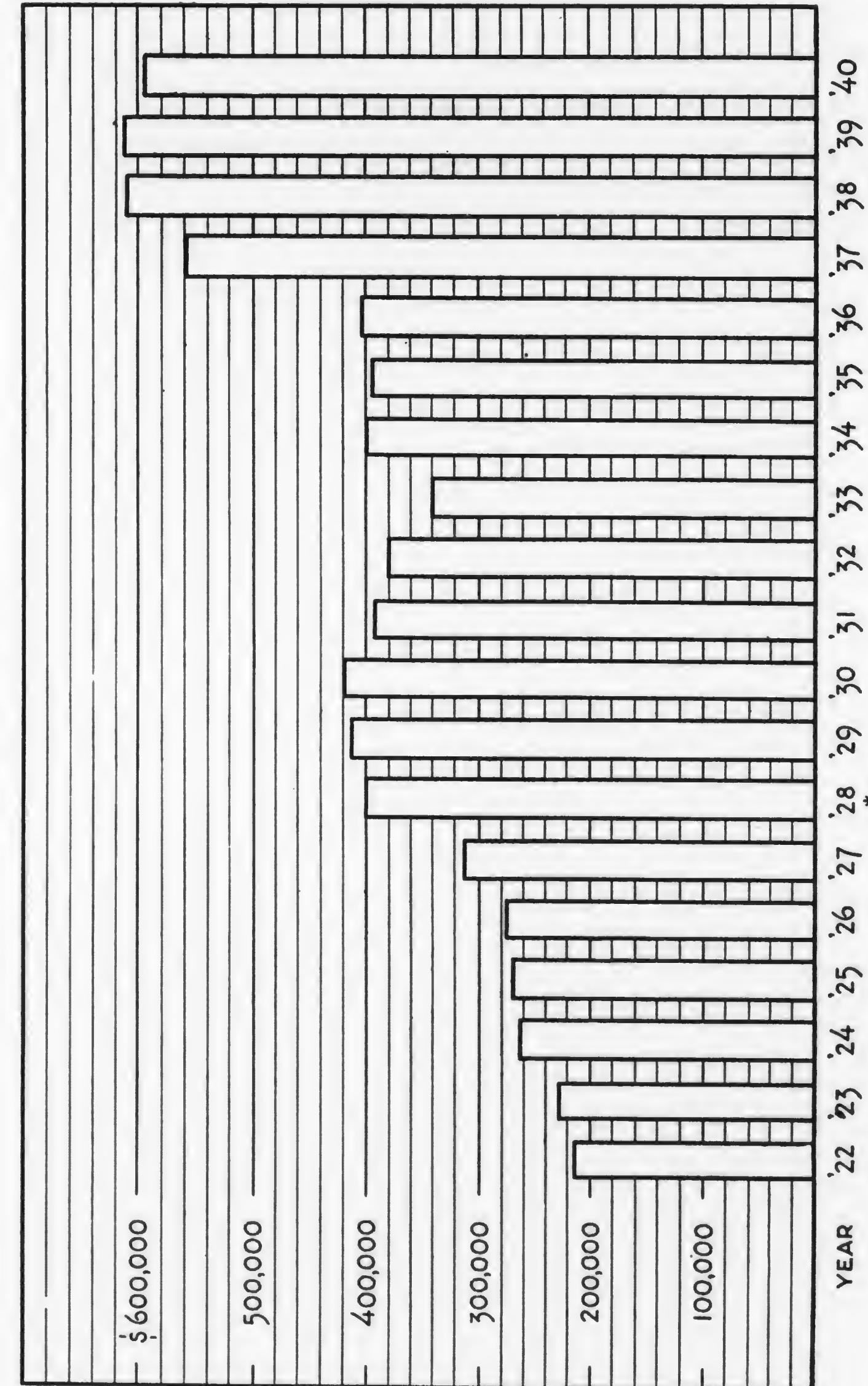
— Decrease.





86

RECEIPTS FROM RESIDENT AND NON-RESIDENT  
FISHING LICENSES



87

\* RESIDENT LICENSES INCREASED TO \$1.50

## FISH FUND—JUNE 1, 1938, TO MAY 31, 1939

Balance June 1, 1938 .....	\$576,916.43
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## Receipts

Fish law fines .....	\$12,537.03
Commercial hatchery licenses .....	1,035.00
Seine licenses .....	10.00
Motor boat fines .....	190.00
Lake Erie licenses .....	2,440.00
Non-resident and tourist fishing licenses .....	20,299.00
Interest .....	2,225.81
Resident fishing licenses .....	729,795.20
Motor boat licenses .....	9,738.25
Sale of publications .....	4,881.71
Contributions .....	9,450.00
Eel chute licenses .....	159.00
Sale of unserviceable property .....	185.08
Miscellaneous .....	124.88
	793,070.96

Total funds available .....	\$1,369,987.39
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## Expenditures

Salary of Commissioner .....	\$6,000.00
Office salaries .....	15,720.00
Hatching and propagating .....	260,922.64
Commissioners' expenses .....	5,960.93
Legal expenses .....	125.00
Salaries and expenses of wardens .....	102,723.95
Office expenses .....	11,484.37
Boat patrol .....	53.36
Purchase of land .....	13.00
Field work .....	28,853.36
Buildings and ponds .....	20,462.13
Publicity and research .....	20,408.80
Refunded fines .....	60.00
Printing .....	3,046.19
State Department Retirement Board .....	3,825.00
Department of Revenue .....	17,787.24
	497,445.97

Balance May 31, 1939 .....	\$872,541.42
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## FISH FUND JUNE 1, 1939, TO MAY 31, 1940

Balance June 1, 1939 .....	\$872,541.42
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## Receipts

Fish law fines .....	\$12,483.25
Commercial hatchery licenses .....	975.00
Seine licenses .....	10.00
Motor boat fines .....	210.00
Lake Erie licenses .....	3,082.00
Non-resident and tourist fishing licenses .....	17,619.69
Interest .....	5,080.45
Resident fishing licenses .....	552,344.01
Motor boat licenses .....	12,466.25
Sale of publications .....	3,827.85
Contributions .....	10,975.00
Eel chute licenses .....	179.00
Sale of unserviceable property .....	377.12
Miscellaneous .....	16.26
Refunds not credited to allocation .....	311.60
	619,957.48

Total funds available .....	\$1,492,498.90
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## Expenditures

Salary of Commissioner .....	\$6,000.00
Office salaries .....	15,617.67
Hatching and propagating .....	313,730.42
Commissioners' Expenses .....	4,061.38
Legal expenses .....	1,194.40
Salaries and expenses of wardens .....	101,439.85
Office expenses .....	11,073.48
Boat patrol .....	59.51
Purchase of land .....	11,650.00
Field work .....	58,467.58
Buildings and ponds .....	60,770.45
Publicity and research .....	20,334.16
Refunded fines .....	—
Printing .....	3,766.51
State Department—Retirement Board .....	2,535.00
Department of Revenue .....	17,255.70
	627,956.11

Balance June 1, 1940 .....	\$864,542.79
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**DATA IN RE: NUMBER OF RESIDENT, NON-RESIDENT AND  
TOURIST FISHING LICENSES ISSUED SINCE THE  
LAWS BECAME EFFECTIVE**

Year	Number	Cost
<b>Resident (Effective January 1, 1922)</b>		
1922.....	203,061	\$1.00 each
1923.....	214,392	1.00 each
1924.....	247,281	1.00 each
1925.....	250,873	1.00 each
1926.....	261,109	1.00 each
1927.....	293,397	1.00 each
1928.....	255,275	1.50 each
1929.....	263,633	1.50 each
1930.....	264,589	1.50 each
1931.....	250,940	1.50 each
1932.....	242,863	1.50 each
1933.....	216,424	1.50 each
1934.....	258,166	1.50 each
1935.....	254,961	1.50 each
1936.....	261,939	1.50 each
1937.....	359,528	1.50 each
1938.....	395,714	1.50 each
1939.....	397,388	1.50 each
1940.....	384,231	1.50 each
<b>Non-resident (Effective July 8, 1919)</b>		
1919.....	50	5.00 each
1920.....	1,836	5.00 each
1921.....	2,031	5.00 each
1922.....	2,768	5.00 each
1923.....	2,931	5.00 each
1924.....	2,964	5.00 each
1925.....	3,182	5.00 each
1926.....	3,776	Reciprocal *
1927.....	5,200	Reciprocal
1928.....	6,236	Reciprocal
1929.....	6,473	Reciprocal
1930.....	4,739	Reciprocal
1931.....	4,122	Reciprocal
1932.....	3,357	Reciprocal
1933.....	2,799	Reciprocal
1934.....	3,063	Reciprocal
1935.....	2,936	Reciprocal
1936.....	2,081	Reciprocal
1937.....	3,464	Reciprocal
1938.....	3,251	Reciprocal
1939.....	3,149	Reciprocal
1940.....	3,487	Reciprocal
<b>Tourist (Effective September 1, 1935)</b>		
1935.....	38	\$1.50 each
1936.....	1,908	1.50 each
1937.....	2,778	1.50 each
1938.....	3,035	1.50 each
1939.....	3,052	1.50 each
1940.....	3,073	1.50 each

\* But not less than \$2.50.

**RESIDENT CITIZEN'S FISHING LICENSES ISSUED  
Calendar Years 1931-1940, Inc.**

	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940
<b>Totals -----</b>	<b>250,940</b>	<b>242,863</b>	<b>216,424</b>	<b>258,166</b>	<b>254,961</b>	<b>265,175</b>	<b>259,126</b>	<b>385,308</b>	<b>398,109</b>	<b>382,962</b>
Adams -----	729	828	822	1,058	1,070	1,107	1,629	1,206	1,296	1,077
Allegheny -----	11,257	10,264	8,961	11,754	13,080	14,778	25,129	36,052	38,153	39,260
Armstrong -----	2,369	1,954	1,616	2,621	2,865	3,169	4,572	5,329	5,154	5,134
Beaver -----	1,807	1,734	1,538	2,153	2,298	2,824	5,695	6,493	6,283	6,418
Bedford -----	1,635	1,517	1,367	1,862	1,628	1,693	2,195	2,758	2,782	2,748
Berks -----	9,054	8,332	7,499	8,561	8,723	9,167	12,941	13,281	12,914	9,634
Blair -----	5,896	5,952	5,366	5,946	5,684	6,060	7,642	8,013	8,043	8,339
Bradford -----	3,890	4,260	4,136	4,578	4,224	4,346	5,096	5,065	5,006	4,577
Bucks -----	2,335	2,001	1,693	1,887	1,811	1,706	23,362	3,063	3,040	3,316
Butler -----	2,250	2,140	1,742	2,514	2,649	2,999	5,220	5,077	5,063	4,828
Cambria -----	5,549	5,886	4,687	6,002	6,776	6,405	9,223	11,102	11,736	11,240
Cameron -----	597	738	699	827	594	742	835	896	892	778
Carbon -----	3,241	2,956	2,694	3,141	3,125	3,258	3,669	3,656	3,845	3,525
Centre -----	2,462	2,586	2,850	3,632	3,515	3,683	4,429	4,810	5,056	4,871
Chester -----	2,152	1,928	1,854	2,167	2,124	2,089	3,233	4,151	4,279	5,303
Clarion -----	1,844	1,740	1,720	1,957	1,913	1,949	2,885	3,290	3,192	2,869
Clearfield -----	2,663	2,944	2,386	3,240	3,125	3,113	4,394	5,104	5,059	4,626
Clinton -----	2,533	2,609	2,547	2,741	2,648	2,607	3,343	4,013	4,072	2,846
Columbia -----	3,205	2,867	2,646	2,877	2,993	3,044	3,341	3,363	3,570	3,777
Crawford -----	4,055	3,887	3,678	4,325	4,647	4,765	6,487	7,290	7,212	6,918
Cumberland -----	1,866	1,717	2,046	2,537	2,387	2,580	3,631	3,784	4,345	3,305
Dauphin -----	5,130	5,230	4,185	4,633	4,850	5,357	7,566	14,297	10,950	11,772
Delaware -----	1,226	1,299	1,335	1,713	1,734	1,703	2,251	2,863	2,943	3,341
Elk -----	1,838	2,223	1,666	1,725	1,595	1,651	2,418	2,726	3,086	2,861
Erie -----	7,586	6,560	5,333	7,104	7,280	8,398	12,069	12,001	13,488	13,378
Fayette -----	2,394	1,914	1,392	1,815	1,877	2,792	4,422	5,478	5,186	4,931
Forest -----	760	636	670	746	565	637	897	888	813	595
Franklin -----	1,762	1,759	1,556	1,824	1,669	1,903	2,578	2,971	3,158	3,223
Fulton -----	292	303	317	426	392	448	562	563	572	604
Greene -----	702	769	652	1,038	1,221	1,148	1,667	1,951	1,557	1,318
Huntingdon -----	1,960	1,693	1,585	2,108	2,330	2,449	2,850	2,811	2,772	2,661
Indiana -----	1,779	1,488	1,162	1,613	1,884	1,800	2,800	3,565	3,974	3,241
Jefferson -----	1,907	2,023	1,704	2,095	1,885	1,827	2,681	2,983	3,320	3,055
Juniata -----	630	647	573	646	649	566	770	801	798	702
Lackawanna -----	19,023	17,238	15,208	17,794	15,891	16,075	17,979	18,875	18,775	16,340
Lancaster -----	5,395	5,515	5,365	6,426	6,310	6,879	9,992	10,370	9,949	9,279
Lawrence -----	3,160	2,484	2,435	3,303	3,196	3,437	5,266	6,355	6,505	6,076
Lebanon -----	2,289	2,173	2,008	2,520	2,372	2,436	3,853	2,913	4,177	4,399
Lehigh -----	7,035	6,659	5,479	6,277	6,223	5,371	7,098	7,324	7,875	7,433
Luzerne -----	22,844	23,905	20,731	23,149	22,518	23,203	24,891	24,574	25,467	23,346
Lycoming -----	7,618	7,336	6,243	7,306	6,894	6,955	7,850	7,387	8,264	7,897
McKean -----	2,894	4,081	3,858	4,385	3,969	3,862	5,545	5,605	5,442	4,903
Mercer -----	3,461	2,947	2,575	3,660	3,608	4,025	6,678	8,327	7,540	7,498
Mifflin -----	2,215	2,080	1,824	2,139	2,179	2,152	2,801	3,082	3,141	3,034
Monroe -----	3,311	2,890</td								

STATEMENT OF PROSECUTIONS FOR VIOLATIONS OF THE FISH LAWS—Calendar Years 1938-1940

Charge	Number of Arrests		
	1938	1939	1940
Illegal devices .....	126	147	99
Fishing without license .....	240	178	92
Fishing on Sunday .....	8	—	—
Fish under legal size .....	125	104	90
Aliens fishing .....	12	8	5
Using explosives .....	7	12	2
Fish out of season .....	82	64	55
Lending license .....	16	13	6
Taking frogs by use of light .....	4	14	2
Frogs and tadpoles out of season .....	11	7	4
Pollution .....	—	5	6
Exceeding creel limit .....	40	52	63
Using borrowed or stolen license .....	17	7	5
Violation of motor boat law .....	28	28	23
Drawing off dam without permit .....	—	1	—
Fishing on State fish hatchery property .....	—	—	5
Fishing in posted waters .....	8	15	7
Selling bass or trout .....	—	1	—
Interfering with officer .....	1	1	2
Refusing to show license .....	1	—	—
Rods not under control .....	3	—	—
Operating eel chute without permits .....	1	4	3
Fishing on Sunday without land owner's consent .....	—	1	1
Violating rules and regulations of Board .....	18	17	36
Using unsigned license .....	1	—	—
Not displaying button .....	1	—	1
Non-resident fishing on resident license .....	3	3	12
Preventing migration .....	—	1	—
Exceeding bag limit for frogs .....	—	3	—
Exceeding bag limit for terrapin .....	—	2	—
<b>Totals .....</b>	<b>753</b>	<b>688</b>	<b>519</b>
Fines remitted by magistrates .....	\$12,981.60	\$14,377.68	\$9,538.50

REPORT OF COMMERCIAL FISH HATCHERIES FOR CALENDAR YEAR 1938

Species	Number	Pounds	Eggs	Value
Brook trout—Market .....	—	29,872 1/4	—	\$21,958.62
Brook trout—Live mature .....	133,867	—	—	31,842.38
Brook trout—Adv. fry .....	56,485	—	—	291.30
Brook trout—Green eggs .....	—	—	28,000,000	2,800.00
Brook trout—Eyed eggs .....	—	—	10,582,880	10,301.63
Brown trout—Market .....	—	907 1/2	—	545.80
Brown trout—Live mature .....	13,237	—	—	4,991.10
Brown trout—Adv. fry .....	331	—	—	17.60
Brown trout—Green eggs .....	—	—	40,000	50.00
Brown trout—Eyed eggs .....	—	—	310,910	407.24
Rainbow trout—Market .....	—	635 1/4	—	612.05
Rainbow trout—Live mature .....	10,901	—	—	1,817.63
Bass .....	14,640	—	—	843.75
Bait-fish .....	465,422	—	—	10,085.12
Goldfish .....	105,367	—	—	3,353.92
Catfish .....	500	—	—	12.50
Sunfish .....	3,132	—	—	151.90
Pickeral .....	482	—	—	120.50
Fish-bait .....	31,277	—	—	627.53
<b>Totals .....</b>	<b>835,641</b>	<b>31,415</b>	<b>38,943,790</b>	<b>\$90,839.57</b>

REPORT OF COMMERCIAL FISH HATCHERIES FOR CALENDAR YEAR 1939

Species	Number	Pounds	Eggs	Value
Brook trout—Market .....	—	46,945	—	\$28,220.16
Brook trout—Live mature .....	187,887	—	—	37,548.05
Brook trout—Adv. fry .....	53,180	—	—	278.00
Brook trout—Green eggs .....	—	—	6,300,000	6,175.00
Brook trout—Eyed eggs .....	—	—	5,427,300	4,653.50
Brown trout—Market .....	—	2,072	—	1,139.90
Brown trout—Live mature .....	39,141	—	—	11,335.20
Brown trout—Adv. fry .....	1,060	—	—	78.00
Brown trout—Green eggs .....	—	—	700,000	805.00
Brown trout—Eyed eggs .....	—	—	1,002,700	1,248.84
Rainbow trout—Market .....	—	2,044	—	1,406.67
Rainbow trout—Live mature .....	25,392	—	—	6,744.30
Rainbow trout—Adv. fry .....	2,125	—	—	183.50
Rainbow trout—Eyed eggs .....	—	—	150,000	237.50
Bass .....	2,728	—	—	952.00
Bait-fish .....	463,442	—	—	9,394.47
Goldfish .....	208,435	—	—	4,260.36
Catfish .....	1,350	—	—	13.50
Sunfish .....	10,979	—	—	448.50
Pickeral .....	306	—	—	102.00
Fish-bait .....	51,857	—	—	997.70
<b>Totals .....</b>	<b>1,047,882</b>	<b>51,061</b>	<b>13,580,000</b>	<b>\$116,217.15</b>

REPORT OF COMMERCIAL FISH HATCHERIES FOR CALENDAR YEAR 1940

Species	Number	Pounds	Eggs	Value
Brook trout—Market	—	35,128½	—	\$21,368.62
Brook trout—Live mature	175,445	—	—	39,063.99
Brook trout—Adv. fry	35,700	—	—	186.50
Brook trout—Green eggs	—	—	5,560,000	5,560.00
Brook trout—Eyed eggs	—	—	11,730,000	11,507.50
Brown trout—Market	—	1,108	—	644.00
Brown trout—Live mature	50,038	—	—	14,035.19
Brown trout—Adv. fry	10,000	—	—	50.00
Brown trout—Eyed eggs	—	—	554,000	644.00
Rainbow trout—Market	—	1,671½	—	1,323.27
Rainbow trout—Live mature	21,976	—	—	3,173.70
Rainbow trout—Adv. fry	13,000	—	—	104.00
Rainbow trout—Eyed eggs	—	—	133,000	207.75
Bass	1,200	—	—	110.00
Bait-fish	784,061	—	—	16,344.16
Goldfish	259,154	—	—	5,317.53
Catfish	21,785	—	—	253.75
Sunfish	1,600	—	—	95.00
Pickerel	1,096	—	—	396.20
Yellow perch	505	—	—	12.50
Fish-bait	91,488	—	—	1,374.23
Totals	1,467,048	37,908	17,977,000	\$121,771.89

DISTRIBUTION OF FISH—JANUARY 1 TO DECEMBER 31, 1937

Species	Size	Number
Brook trout	6 inches to 10 inches	678,825
Brown trout	6 inches to 14 inches	440,934
Rainbow trout	7 inches to 21 inches	202,040
Brook trout	Fingerling	1,404,905
Brown trout	Fingerling	1,378,050
Rainbow trout	Fingerling	220,750
Black bass	1 inch to 16 inches	357,409
Pike perch	Fry to 16 inches	21,040,206
Yellow perch	Fry to 10 inches	143,927,920
Blue gill sunfish	1 inch to 8 inches	784,135
Catfish	2 inches to 10 inches	472,694
Minnows	2 inches to 6 inches	16,043
Blue pike (Lake Erie)	Fry	61,769,000
Pickerel	14 inches to 18 inches	3,170
Frogs (embryo)	1 inch to 4 inches	406,300
Suckers	2 inches to 10 inches	19,155
Miscellaneous	—	24,361
Total		233,154,987

In addition to the fingerling distribution, the Board also furnished 207,000 fingerling trout for cooperative nurseries.

DISTRIBUTION OF FISH—JANUARY 1 TO DECEMBER 31, 1938

Species	Size	Number
Brook, brown and rainbow trout	6 inches to 21 inches	1,396,072
Brook, brown and rainbow trout	Fingerling	3,205,475
Black bass	1 inch to 16 inches	526,608
Pike perch	Fry to 16 inches	7,081,069
Yellow perch	Fry to 10 inches	163,092,418
Cisco (Lake Erie)	Fry	1,530,000
Blue gill sunfish	1 inch to 8 inches	964,387
Catfish	2 inches to 10 inches	417,085
Minnows	2 inches to 6 inches	218,028
Blue pike (Lake Erie)	Fry	54,631,000
White fish (Lake Erie)	Fry	2,000,000
Pickerel	14 inches to 18 inches	4,849
Suckers	2 inches to 10 inches	10,101
Total		235,077,092

DISTRIBUTION OF FISH—JANUARY 1 TO DECEMBER 31, 1939

Species	Size	Number
Brook, brown and rainbow trout	6 inches to 21 inches	1,511,834
Brook, brown and rainbow trout	Fingerling	1,864,350
Black bass	2 inches to 20 inches	254,101
Pike perch	Fry to 16 inches	25,714,088
Yellow perch	Fry to 10 inches	219,970,735
Cisco (Lake Erie)	Fry	13,600,000
Blue gill sunfish	1 inch to 8 inches	2,020,767
Catfish	2 inches to 12 inches	941,447
Minnows	2 inches to 6 inches	949,626
Blue pike (Lake Erie)	Fry	7,625,000
Pickerel	14 inches to 18 inches	4,717
Suckers	2 inches to 10 inches	121,180
Frogs (embryo)	—	481,169
Miscellaneous	—	85,600
Total		275,144,614

DISTRIBUTION OF FISH—JANUARY 1 TO DECEMBER 31, 1940

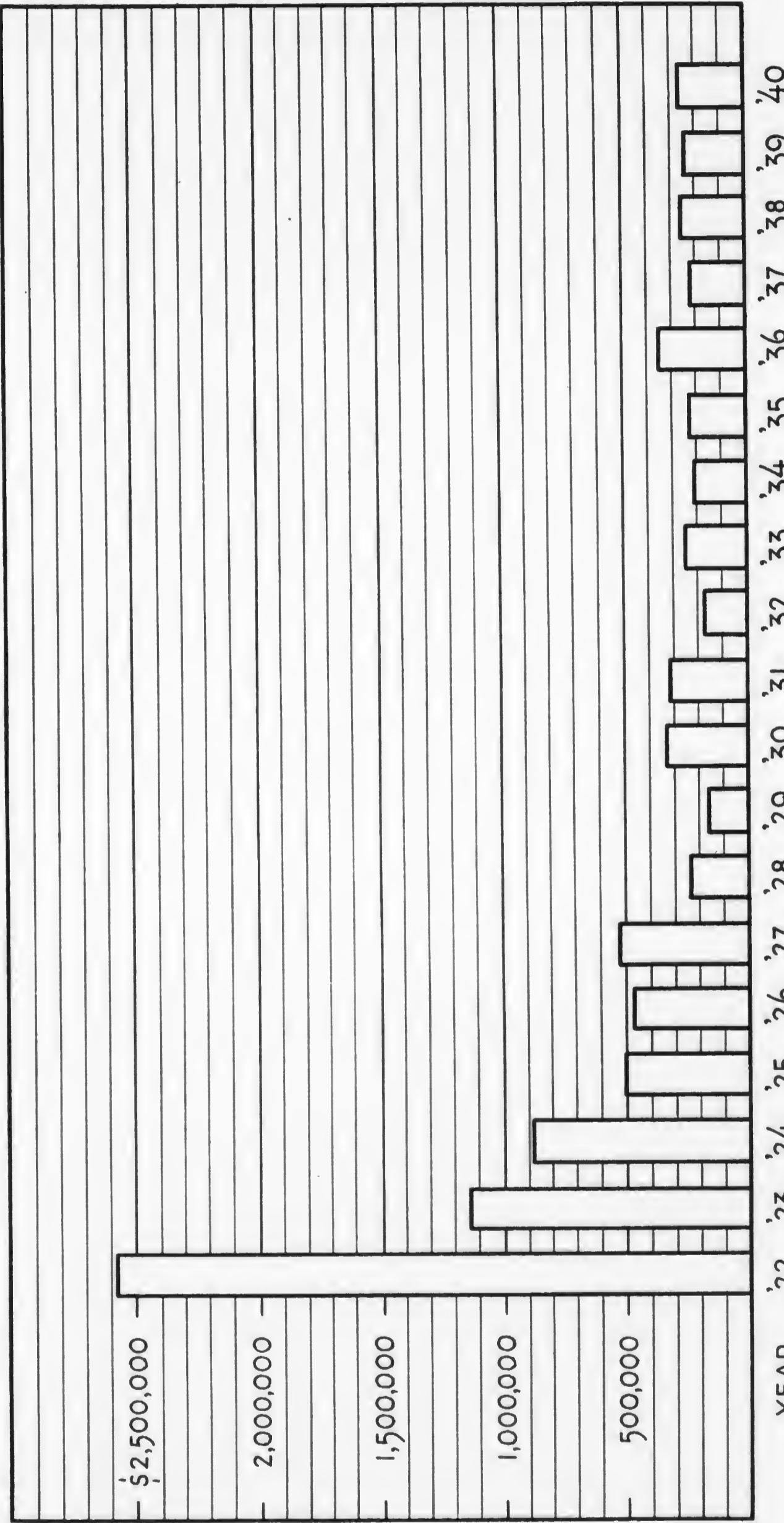
Species	Size	Number
Brook, brown and rainbow trout	6 inches to 19 inches	1,393,330
Brook, brown and rainbow trout	Fingerling	2,560,000
Black bass	1 inch to 14 inches	548,988
Bream	2 inches to 8 inches	326,770
Catfish	3 inches to 11½ inches	498,793
Pike perch	Fry to 24 inches	25,711,140
Yellow perch	Fry to 8 inches	309,483,495
Cisco	Fry	12,000,000
Minnows	3 inches to 6 inches	81,320
Pickerel	6 inches to 20 inches	2,982
Suckers	3 inches to 18 inches	39,935
Frog (embryo)	—	149,506
Miscellaneous	—	102,162
Total		352,898,421

DISTRIBUTION OF FISH IN PENNSYLVANIA BY SPECIES, CALENDAR YEARS 1931-1940, INCLUSIVE

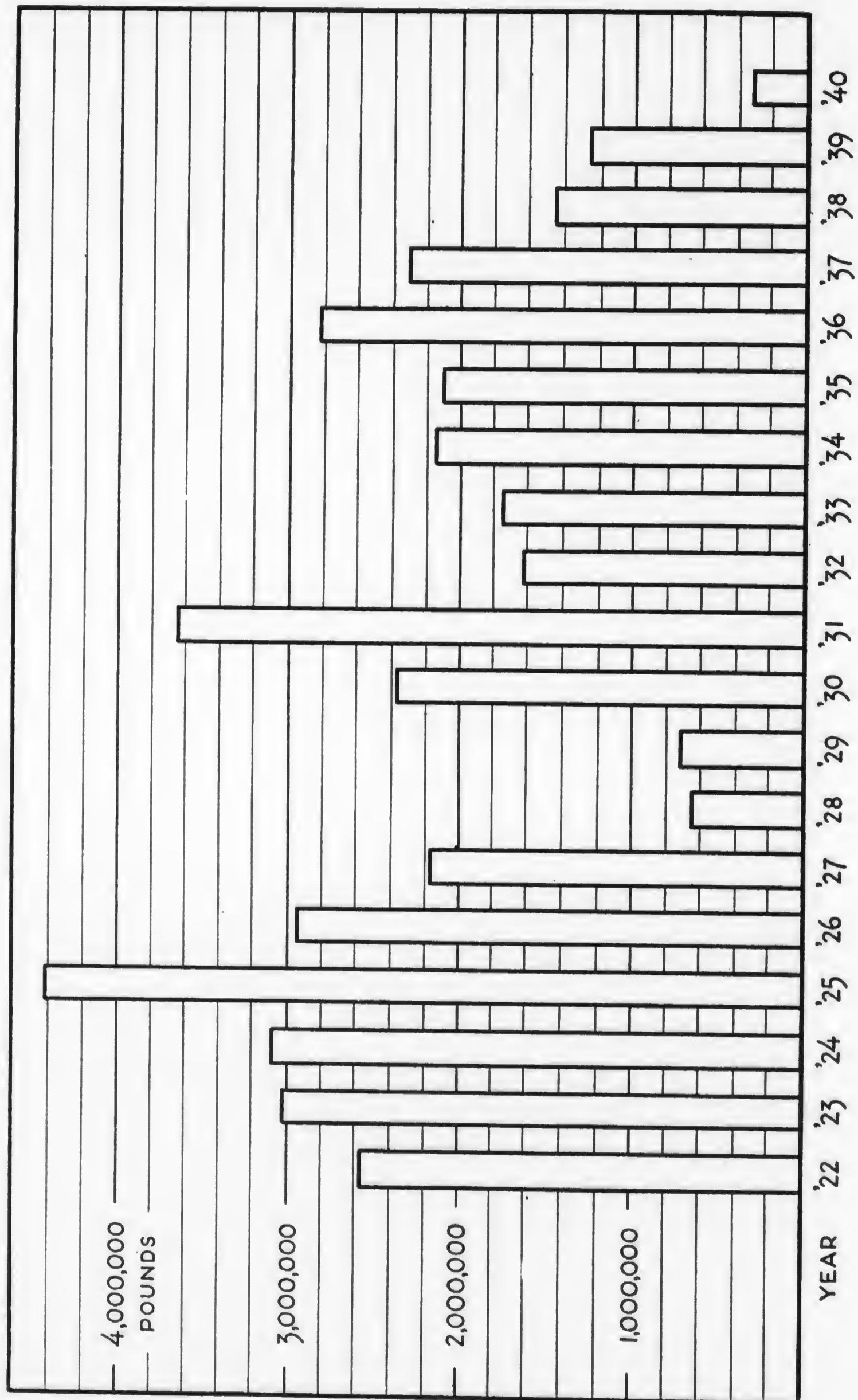
Kind of Fish	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940
Trout (all species) -----	1,000,604	1,098,741	857,225	1,325,897	1,248,356	821,800	1,330,799	1,396,072	1,511,834	1,393,330
Bass (all species) -----	387,474	205,030	182,932	222,480	37,670	167,265	357,409	526,908	254,101	548,988
Pike perch -----	22,635,242	35,754,050	40,070,200	50,896,049	14,508,475	12,477,448	21,040,296	7,081,069	25,714,088	25,711,140
Yellow perch -----	375,942,140	390,774,992	363,190,969	470,179,705	475,161,212	254,234,780	143,927,920	163,082,418	219,970,735	300,453,495
Sunfish (Bream) -----	1,028,450	1,912,050	2,313,350	2,287,250	1,081,038	371,848	784,135	964,387	2,020,767	326,770
Catfish -----	668,375	406,793	705,126	770,918	414,437	238,633	472,694	417,085	941,447	498,793
Minnows -----	2,062,800	996,560	880,125	1,495,600	1,150,835	723,850	16,043	218,028	949,626	81,320
Whitefish -----	1,500,000	—	5,184,000	—	36,500,000	14,000,000	—	2,000,000	—	—
Cisco -----	8,100,000	2,500,000	27,040,000	23,380,000	3,240,000	8,460,000	—	1,530,000	13,600,000	12,000,000
Frogs and tadpoles -----	904,200	877,700	963,400	1,054,940	940,500	363,500	406,300	—	481,169	149,506
Blue pike -----	104,952,250	158,770,000	99,179,000	41,968,000	68,613,000	21,242,000	61,769,000	54,631,000	7,625,000	—
Stuckers -----	1,764,850	15,028,770	—	1,860	14,130	9,429	19,155	10,101	121,180	39,935
Pickerel -----	5,757	4,280	8,784	5,272	—	—	3,170	4,849	4,717	2,982
Miscellaneous -----	86,315	54,500	—	—	3,571	52,899	24,361	—	85,600	102,162
Fingerling trout -----	—	—	147,500	2,174,690	1,991,662	1,728,490	3,003,705	3,205,475	1,864,350	2,560,000
Lake trout -----	—	—	80,000	76,800	—	—	—	—	—	—
Totals -----	521,038,457	608,333,466	540,833,211	595,839,461	604,913,886	314,891,951	233,154,987	235,077,092	275,144,614	352,898,421

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**ESTIMATED VALUE CATCH OF FISH LAKE ERIE  
PENNSYLVANIA WATERS**

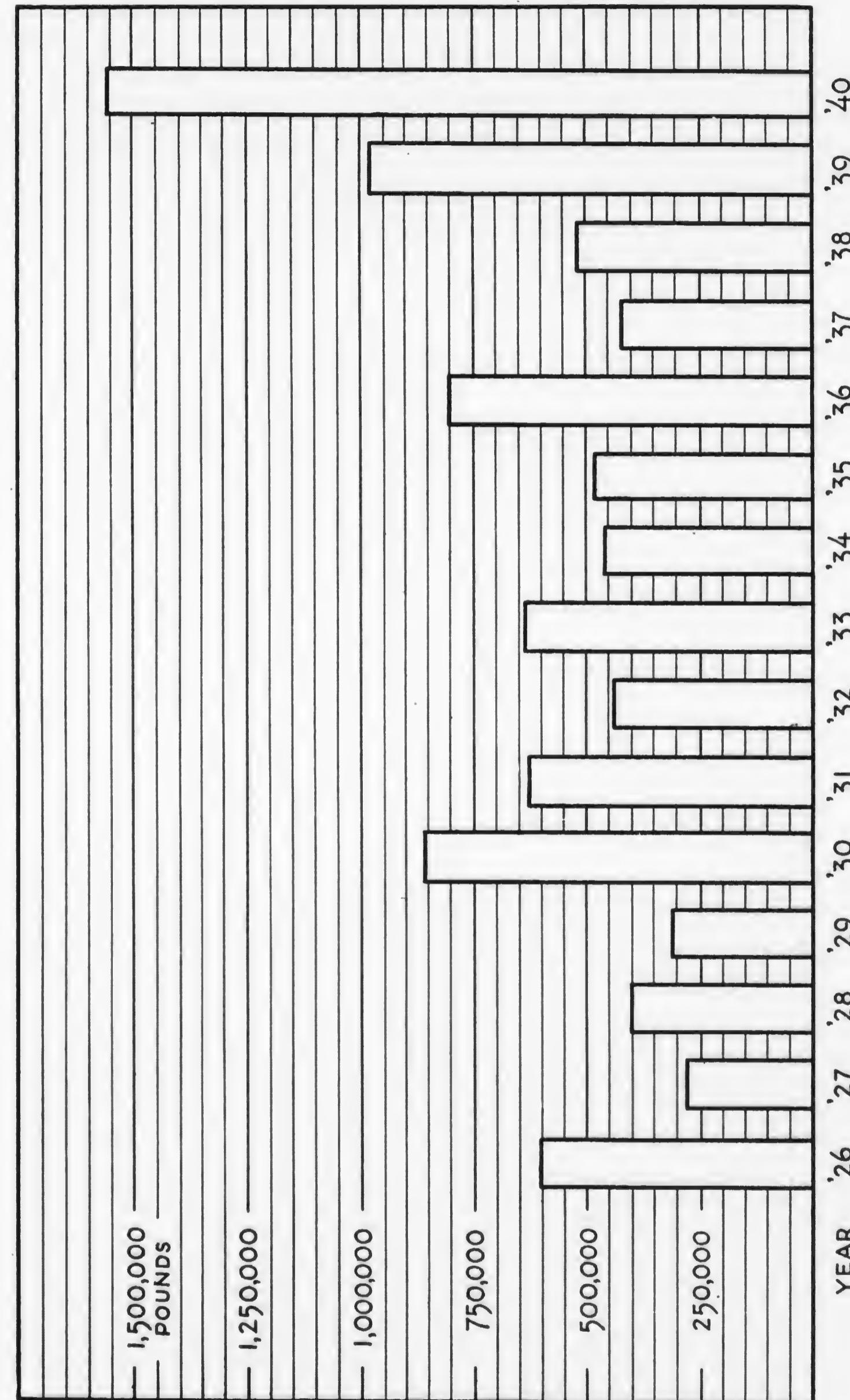


CATCH BY POUNDS BLUE PIKE - LAKE ERIE



98

CATCH BY POUNDS WHITE FISH - LAKE ERIE



99

COMPARATIVE STATEMENT BY YEARS SHOWING CATCH OF FISH IN LAKE ERIE PENNSYLVANIA WATERS—1931-1940, INCLUSIVE

Species of Fish	1931		1932		1933	
	Pounds	Estimated Value	Pounds	Estimated Value	Pounds	Estimated Value
Totals	5,008,147	\$314,364.51	2,521,161	\$169,015.67	2,894,467	\$224,813.55
Cisco	127,599	\$14,752.58	82,836	\$8,877.65	104,033	\$10,363.08
Blue pike	3,680,999	164,873.27	1,611,675	69,870.91	1,747,398	101,149.79
Yellow perch	480,214	21,087.83	331,278	13,768.34	277,909	15,278.98
Pike perch	14,200	1,778.65	13,832	2,039.64	19,792	2,132.23
White fish	633,479	108,407.36	447,378	73,298.54	644,293	92,514.09
Lake trout	1,257	170.35	1,051	106.65	367	38.74
Catfish	11,496	1,109.76	3,972	279.42	5,050	246.21
Carp	—	—	6,871	166.08	4,105	90.92
Sturgeon	358	—	107.40	—	479	101.90
Burbot	—	—	—	—	—	—
White bass	—	—	—	—	—	—
Mullets	—	—	2,522	87.98	18,831	658.93
Grey bass	—	—	—	9,466	22,631	454.97
Miscellaneous	58,545	2,077.31	1,421	54.40	12,091	241.82
						1,541.80
<sup>1</sup> 42,000 pounds burbot given to charity.						
<sup>2</sup> 4,500 pounds burbot given to charity.						

300 pounds burbot given to charity.

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COMPARATIVE STATEMENT BY YEARS SHOWING CATCH OF FISH IN LAKE ERIE PENNSYLVANIA WATERS—1931-1940, INC.—Concluded

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115

,000 pounds burbot given to charity.

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LAKE FISHERIES, 1938  
Catch by States

Species	New York		Pennsylvania		Ohio		Michigan		Indiana	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Blue pike -----	1,122,200	\$78,554	1,441,900	\$100,933	6,153,800	\$414,756	—	—	—	—
Bowfin -----	1,700	34	—	—	281	4,682	3,900	\$78	—	—
Burbot -----	19,100	191	28,100	4,000	1,457,500	43,725	22,600	226	1,200	—
Carp -----	173,100	10,386	4,000	80	409,400	32,782	1,381,500	41,245	4,000	\$24
Catfish and bullheads -----	52,800	3,696	1,800	108	—	—	220,100	15,234	—	160
Chubs -----	—	—	—	—	—	—	1,678,500	201,420	277,000	22,157
Cisco -----	432,700	51,924	371,900	44,628	41,200	6,180	—	—	—	—
Eels, common -----	44,300	2,658	—	—	—	—	—	—	—	—
Garfish -----	5,900	59	—	—	—	—	—	—	—	—
Goldfish -----	—	—	—	—	210,700	8,428	10,160,000	4,000	160	—
Lake herring -----	6,200	620	—	—	—	—	—	—	—	—
Lake trout -----	16,900	3,440	100	20	—	—	5,933,900	306,446	227,600	11,381
Mooneye -----	—	—	—	—	—	—	886,885	174,200	174,200	27,834
Pike or pickerel (Jacks) -----	10,900	1,090	—	—	—	—	—	—	—	—
Rock bass -----	4,400	264	—	—	—	—	48,400	4,840	—	—
Sauger -----	200	14	2,646	—	—	—	33,900	2,034	—	—
Sheephead -----	100	2	336	—	406	3,258,900	80,210	44,600	4,460	—
Smelt -----	—	—	—	—	—	—	97,167	167,200	3,144	—
Steelhead trout -----	—	—	—	—	—	—	673,300	201,199	—	—
Sturgeon -----	18,800	6,580	300	81	11,700	3,510	—	—	1,200	240
Sucker "mullet" -----	163,900	4,617	15,200	304	673,700	26,948	3,342,800	100,294	—	—
Sunfish -----	44,100	2,646	—	—	—	—	114,900	11,490	5,000	150
White bass -----	5,600	336	35,600	1,424	668,400	40,104	22,700	1,362	—	—
Whiteshell:	—	—	—	—	—	—	—	—	—	—
Common -----	146,900	33,985	526,200	105,240	291,900	58,380	2,003,700	400,740	—	—
Menominee -----	—	—	—	—	—	—	114,900	11,490	—	—
Yellow perch -----	108,000	7,560	199,900	11,994	4,912,000	392,960	1,236,300	98,904	—	—
Yellow pike -----	8,300	830	28,200	2,820	2,923,400	292,340	1,587,600	158,760	—	3,650
Mussel shells <sup>1</sup> -----	—	—	—	—	—	—	168,500	4,178	—	—
Pearls and slugs <sup>1</sup> -----	—	—	—	—	—	—	—	79	—	—
Totals -----	2,376,100	\$208,436	2,673,500	\$268,319	22,040,100	\$1,502,624	28,838,400	\$2,265,178	763,200	\$65,596

<sup>1</sup> From tributary streams.

LAKE FISHERIES, 1938—Continued  
Catch by States—Concluded

Species	Illinois		Wisconsin		Minnesota		Totals	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Blue pike -----	—	—	—	—	—	—	8,717,900	\$594,243
Bowfin -----	5,000	\$100	26,300	\$263	21,500	\$223	5,600	112
Burbot -----	—	—	1,828,500	74,675	11,000	221	357,900	5,990
Carp -----	—	—	65,200	4,564	41,300	2,064	4,850,000	170,462
Catfish and bullheads -----	524,900	78,730	3,308,300	394,082	63,800	6,380	5,852,500	58,448
Chubs -----	—	—	—	—	—	—	845,300	702,769
Cisco -----	—	—	—	—	400	16	44,300	102,732
Grapple -----	—	—	—	—	—	—	5,300	16
Eels, common -----	—	—	—	—	—	—	214,700	214,700
Garfish -----	—	—	—	—	—	—	20,522,900	634,695
Goldfish -----	7,289	4,251,400	191,449	5,731,900	117,510	47,195	9,359,300	1,486,871
Lake herring -----	62,277	2,460,300	466,220	462,800	11,300	11,300	11,300	452
Lake trout -----	311,400	—	—	—	168,400	12,731	231,100	18,991
Sauger -----	—	—	—	—	87,900	6,290	38,300	2,298
Sheephead -----	—	—	—	—	—	—	934,800	90,974
Smelt -----	—	—	1,172,500	35,175	—	—	1,845,800	55,374
Steelhead trout -----	—	—	3,400	330	—	—	1,200	240
Sturgeon -----	—	—	—	—	100	25	30,900	10,196
Sucker "mullet"	—	—	619,600	18,488	191,700	3,900	5,001,900	154,701
Sunfish -----	—	—	—	—	878,400	44,100	44,100	2,646
Trullibees -----	—	—	3,400	204	—	43,915	878,400	43,915
White bass -----	—	—	264,500	53,754	60,300	7,069	3,302,500	656,118
Whitemill:	—	—	34,900	3,490	3,600	190	153,400	15,170
Common -----	—	—	1,259,600	75,453	59,600	2,984	8,016,800	601,925
Menominee -----	—	—	40,400	4,040	411,000	40,064	4,988,900	498,854
Yellow perch -----	—	—	6,000	450	—	6,000	289,000	450
Crawfish -----	—	—	130,500	1,825	—	—	—	6,008
Mussel shells <sup>1</sup> -----	—	—	—	—	—	—	—	79
Pearls and slugs <sup>1</sup> -----	—	—	—	—	—	—	—	—
Totals -----	1,155,500	\$156,816	15,475,000	\$1,324,466	8,202,700	\$290,777	81,524,500	\$6,088,212

<sup>1</sup> From tributary streams.

LAKE FISHERIES OF THE UNITED STATES AND CANADA, 1938—Continued  
Catch by Lakes

Species	Lake Huron			Lake Michigan			Lake Superior		
	United States	Canada	Totals	United States	Pounds	United States	Canada	Totals	
Blue pike	—	—	2,000	—	—	—	14,200	14,200	
Bowfin	1,100	1—	1,100	34,300	8,500	1—	—	—	
Burbot	12,000	1—	12,000	1,873,000	300	600	8,500	8,500	
Carp	631,100	49,100	680,200	67,600	—	—	—	900	
Catfish and bullheads	105,700	10,600	116,300	5,494,100	256,300	61,900	318,200		
Chubs	192,100	452,000	644,100	4,477,300	10,383,700	1,855,500	12,449,200		
Lake herring	5,328,800	235,700	5,664,500	4,905,600	3,106,900	1,667,800	4,834,700		
Lake trout	1,270,100	3,800,300	5,704,400	18,400	5,100	8,200	13,300		
Pike or pickerel (jacks)	25,500	128,700	154,200	—	—	—	—		
Rock bass	27,900	1—	27,900	2,000	—	—	—		
Sauger	2,100	1—	2,100	400	—	—	—		
Sheepshead	19,800	1—	19,800	4,600	—	—	—		
Smelt	100	1—	100	1,841,400	4,300	1—	4,300		
Steelhead trout	—	—	—	1,200	—	—	—		
Sturgeon "mullet"	—	12,500	12,500	—	—	2,600	2,600		
White bass	1,788,200	1—	1,788,200	1,858,100	288,700	1—	288,700		
Whitefish:	—	—	—	3,400	—	—	—		
Common	558,000	1,587,100	2,145,100	1,258,900	455,400	311,700	767,100		
Menominee	54,200	1—	54,200	75,700	23,500	1—	23,500		
Yellow perch	500,400	151,800	632,200	2,203,600	7,900	700	8,600		
Yellow pike	1,356,100	358,500	1,714,600	49,600	45,400	75,600	120,900		
Crawfish	—	—	—	6,000	—	—	—		
Mussel shells	5,500	1—	5,500	293,500	—	—	—		
Miscellaneous	—	469,000	469,000	—	—	58,500	58,500		
Totals	12,038,700	7,257,300	19,296,000	24,379,300	14,856,000	4,057,200	18,913,200		

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<sup>1</sup> Where there has been a Canadian catch of these species it is included under "Miscellaneous."

LAKE FISHERIES OF THE UNITED STATES AND CANADA, 1938  
Catch by Lakes—Continued

Species	Lake Ontario			Lake Erie		
	United States	Canada	Totals	United States	Canada	Totals
Blue pike	58,500	58,500	118,000	8,650,400	7,157,700	15,817,100
Bowfin	1,700	1—	1,700	2,800	1—	2,800
Burbot	19,000	1—	19,000	262,600	1—	262,600
Carp	134,700	144,200	278,900	2,209,500	373,900	2,583,400
Catfish and bullheads	52,200	19,200	243,400	463,800	78,300	542,100
Cisco	30,100	45,300	36,100	809,700	1,374,500	2,184,500
Eels, common	—	—	—	—	—	—
Garfish	—	—	—	5,900	1—	5,900
Goldfish	—	—	—	214,700	1—	214,700
Lake herring	6,200	1,236,600	1,236,800	—	—	—
Lake trout	16,900	275,800	292,700	100	1—	100
Menomye	—	—	—	11,300	1—	11,300
Pike or pickerel (jacks)	10,900	104,600	115,500	3,200	20,200	23,400
Rock bass	4,400	1—	4,400	3,400	1—	3,400
Sauger	—	—	—	844,400	1—	844,400
Sheepshead	—	—	—	3,392,300	1—	3,392,300
Sturgeon	10,500	5,300	15,800	20,300	16,500	36,800
Sucker "mullet"	128,600	1—	128,600	756,900	1—	756,900
Sunfish	44,100	1—	44,100	—	—	—
White bass	5,000	1—	5,000	727,300	1—	727,300
Whitefish, common	55,800	602,300	658,100	910,900	1,001,800	1,912,700
Yellow perch	58,400	166,400	227,800	5,186,900	2,595,500	7,782,400
Yellow pike	2,200	15,000	17,200	3,134,600	508,500	3,644,100
Miscellaneous	—	245,800	245,800	—	1,373,100	1,373,100
Totals	689,500	3,086,000	3,775,500	27,619,100	14,501,000	42,120,100

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<sup>1</sup> Where there has been a Canadian catch of these species it is included under "Miscellaneous."

LAKE FISHERIES OF THE UNITED STATES AND CANADA, 1938—Continued  
Catch by Lakes—Continued

Species	Namakan Lake			Rainy Lake		
	United States	Canada	Totals	United States	Canada	Totals
	Pounds	Pounds			Pounds	
Blue pike	—	—	—	—	700	700
Burbot	—	—	—	1,700	1—	1,700
Chubs	—	—	—	—	14,700	14,700
Lake herring	—	—	—	14,000	1—	14,000
Pike or pickerel (Jacks)	2,500	3,800	6,300	27,600	101,100	128,700
Sturgeon	—	500	500	100	700	800
Sucker "mullet"	—	—	—	2,000	1—	2,000
Whitefish, common	30,500	9,300	39,800	29,300	66,100	95,400
Yellow perch	—	—	—	6,000	10,700	16,700
Yellow pike	9,500	5,900	15,400	38,900	182,800	221,700
Miscellaneous	—	—	—	—	90,900	90,900
<b>Totals</b>	<b>42,500</b>	<b>19,500</b>	<b>62,000</b>	<b>119,600</b>	<b>467,700</b>	<b>587,300</b>

<sup>1</sup> Where there has been a Canadian catch of these species it is included under "Miscellaneous."

LAKE FISHERIES OF THE UNITED STATES AND CANADA, 1938—Continued  
Catch by Lakes—Concluded

Species	Lake of the Woods			Totals, All Lakes		
	United States	Canada	Totals	United States	Canada	Totals
	Pounds	Pounds			Pounds	
Blue pike	—	—	—	8,717,900	7,234,100	15,952,000
Bowfin	—	—	—	5,600	1—	5,600
Burbot	19,800	1—	19,800	357,900	1—	357,900
Carp	11,000	1,300	12,300	4,859,600	569,100	5,428,700
Catfish and bullheads	41,300	8,400	49,700	5,852,500	528,600	6,381,100
Chubs	—	—	—	845,800	1,374,500	2,220,300
Cisco	—	1—	400	44,400	42,300	86,800
Grapple	—	—	—	5,900	1—	5,900
Eels, common	—	—	—	214,700	214,700	23,844,700
Garfish	—	—	—	20,522,900	3,321,800	23,844,700
Goldfish	2,900	1—	2,900	9,359,600	5,750,200	15,109,800
Lake herring	—	6,300	6,300	11,300	1—	11,300
Lake trout	—	—	—	231,100	791,800	1,022,900
Mooneye	—	—	—	38,300	1—	38,300
Pike or pickerel (Jacks)	137,900	425,200	563,100	5,001,900	43,900	5,002,200
Rock bass	—	—	—	934,800	3,416,700	3,416,700
Saucher	87,900	43,900	131,800	—	1,845,800	1,845,800
Sheepshead	—	—	—	1,200	1—	1,200
Smelt	—	—	—	30,900	38,100	69,200
Steelhead trout	—	—	—	500	300	500
Sturgeon	180,300	300	180,600	44,100	1—	44,100
Sucker "mullet"	—	—	—	878,400	112,200	900,600
Sunfish	878,400	112,200	990,600	735,700	1—	735,700
Triblives	—	—	—	—	—	—
White bass	—	—	—	—	—	—
Whitefish:	—	—	—	—	—	—
Common	3,700	192,400	196,100	3,302,500	3,770,700	7,073,200
Menominee	53,600	25,800	79,400	153,400	2,953,900	153,400
Yellow perch	362,600	651,500	1,014,100	4,998,900	1,798,700	6,797,600
Yellow pike	—	—	—	6,000	1—	6,000
Crawfish	—	—	—	299,000	2,490,500	2,490,500
Mussel shells	—	—	—	—	—	—
Miscellaneous	—	—	—	—	—	—
<b>Totals</b>	<b>1,779,800</b>	<b>1,720,500</b>	<b>3,500,300</b>	<b>81,524,500</b>	<b>31,109,200</b>	<b>112,633,700</b>

<sup>1</sup> Where there has been a Canadian catch of these species it is included under "Miscellaneous."

LAKE FISHERIES, 1913-1938  
(Expressed in thousands of pounds; that is 000 omitted)

Catch by Lakes

Year	Lake Ontario <sup>1</sup>	Lake Erie	Lake Huron	Lake Michigan	Lake Superior	Lake of the Woods, Rainy Lake and Namakan Lake <sup>2</sup>	Totals
1913							
1914	210	53,571	11,184	26,994	6,417	1,384	3,-
1915	277	59,509	8,248	28,196	7,088	1,246	98,625
1916	395	10,245	10,245	31,680	5,694	1,425	108,948
1917	317	41,223	17,145	23,023	6,437	1,287	88,482
1918	656	41,416	12,512	20,317	9,889	2,103	95,893
1919	524	51,479	14,966	26,675	11,546	1,489	106,679
1920	472	35,164	15,240	29,820	10,500	1,277	92,463
1921	314	32,192	11,250	23,053	9,267	1,299	77,376
1922	1,855	40,731	9,330	17,018	7,476	1,048	83,458
1923	889	40,912	13,481	16,605	6,669	978	79,434
1924	710	44,278	9,920	16,353	7,584	1,150	79,109
1925	1,049	40,264	9,074	17,694	8,944	1,256	78,281
1926	446	26,639	6,567	21,710	12,307	1,463	69,132
1927	785	25,057	13,132	20,495	13,436	2,392	75,300
1928	698	23,796	15,711	23,681	15,302	2,139	81,327
1929	854	19,643	9,943	17,999	13,132	1,797	63,368
1930	948	18,647	10,477	35,614	17,148	2,555	86,389
1931	682	29,540	16,377	30,974	14,694	2,681	94,948
1932	442	34,772	17,727	25,039	11,281	2,446	91,727
1933	521	33,070	15,848	20,632	10,173	2,840	83,744
1934	527	26,187	13,351	21,682	10,653	2,204	74,604
1935	770	32,899	14,512	28,444	11,633	2,396	96,411
1936	700	30,356	13,676	25,089	17,874	2,457	90,222
1937	601	36,777	12,790	25,783	16,009	2,317	94,277
1938	618	26,933	11,895	26,398	16,011	2,103	83,958
	690	27,619	12,039	24,379	14,856	1,942	81,525

<sup>1</sup> Includes the catch in Lake Ontario proper and Chaumont Bay in the years 1913 to 1924, inclusive; Lake Ontario proper in 1925, and Lake Ontario proper, Niagara River below the falls, St. Lawrence River and Ohaumont.

<sup>2</sup> Does not include the catch in Namakan and Rainy Lakes prior to 1926.

<sup>3</sup> Data not available.

Note: The catch in the Detroit River, St. Clair River and Lake St. Clair are not included in these statistics.

LAKE FISHERIES, 1938—Continued  
Operating Units by States and Lakes

Item	New York			Pennsylvania			Ohio		
	Lake Ontario	Lake Erie	Totals	Lake Erie	Totals	Lake Erie	Lake Erie	Lake Erie	Lake Erie
<b>Fishermen:</b>									
On vessels									
On boats and shore:									
Regular	36	47	83	35	35	35	82	82	82
Casual	120	94	214	15	15	15	616	616	616
<b>Totals</b>	167	190	357	183	183	183	933	933	933
<b>Vessels:</b>									
Steam	—	1	1	1	1	1	3	3	3
Net tonnage	—	24	24	24	185	185	96	96	96
Motor	3	9	9	12	16	16	14	14	14
Net tonnage	33	68	101	101	189	189	176	176	176
<b>Total vessels</b>	3	10	13	25	25	25	17	17	17
<b>Total net tonnage</b>	33	92	125	374	374	374	272	272	272
<b>Boats:</b>									
Motor	44	26	70	16	16	16	242	242	242
Other	72	44	116	1	1	1	291	291	291
<b>Apparatus:</b>									
Haul seines	7	6	13	—	—	—	133	133	133
Length, yards	583	516	1,069	—	—	—	64,300	64,300	64,300
Gill nets:	1,337	6,300	7,637	9,060	9,060	9,060	6,175	6,175	6,175
"Shoal," 2 1/4 to 3 1/2 inches	218,070	1,160,000	1,378,070	1,385,000	1,385,000	1,385,000	839,000	839,000	839,000
Square yards	483	3,218	3,701	6,150	6,150	6,150	1,763	1,763	1,763
"Shoal," 4 to 6 inches	90,330	643,600	733,930	1,230,000	1,230,000	1,230,000	342,250	342,250	342,250
Square yards	34	8	12,42	—	—	—	—	—	—
"Shoal," 10 to 14 inches	10,200	2,400	12,600	—	—	—	110	110	110
Square yards	—	—	—	—	—	—	16,500	16,500	16,500
Lines:	88	96	179	—	—	—	—	—	—
Trot	—	35,800	35,800	45	45	45	—	—	—
Hooks	16,600	19,200	—	156	156	156	—	—	—
Pound nets	—	—	—	145	145	145	5,900	5,900	5,900
Trap nets	—	—	—	—	—	—	500	500	500
Fyke nets	—	—	—	—	—	—	—	—	—

LAKE FISHERIES, 1938—Continued  
Operating Units by States and Lakes—Continued

Item	Michigan				Indiana
	Lake Erie	Lake Huron	Lake Michigan	Lake Superior	Totals
Number	Number	Number	Number	Number	Number
Fishermen:					
On vessels					
On boats and shore:					
Regular	—	121	370	107	598
Casual	80	699	403	325	1,516
Total	56	134	275	162	627
Total	145	954	1,048	594	2,741
Vessels:					
Steam	—	5	8	4	17
Net tonnage	—	81	111	134	326
Motor	—	23	96	25	149
Net tonnage	—	448	1,090	323	1,861
Total vessels	—	33	104	29	166
Total net tonnage	—	529	1,201	457	2,187
Boats:					
Motor	20	260	207	222	709
Other	47	253	169	90	559
Apparatus:					
Haul seines	34	69	1	15	119
Length, yards	9,600	33,605	65	2,904	46,174
Gill nets:					
"Shoal," 2½ to 3½ inches	205	2,870	17,682	4,850	25,607
Square yards	41,000	57,000	3,469,900	863,000	4,947,900
"Shoal," 4 to 6 inches	155	5,975	155,400	7,365	315,000
Square yards	31,000	1,337,500	4,004,900	2,129,500	8,102,900
Lines:					
Troll	—	—	—	75	75
Hooks	—	—	—	525	525
Trot	—	20	636	510	3,247
Hooks	6,000	189,900	449	744	1,080,400
Pound nets	—	—	—	—	—
Trap nets	—	189	3,066	—	1,329
Fyke nets	—	285	276	100	3,255
Crowfoot bars	—	—	—	47	667
Picks	—	—	—	19	47
Total	—	—	—	—	—
110	—	—	—	19	—

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LAKE FISHERIES, 1938—Continued  
Operating Units by States and Lakes—Concluded

Item	Illinois				Wisconsin	Minnesota
	Lake Michigan	Lake Michigan	Lake Superior	Totals	Lake Superior	Lake of the Woods, Rainy Lake, and Namakan Lake
Number	Number	Number	Number	Number	Number	Number
Fishermen:						
On vessels	69	563	76	639	6	—
On boats and shore:	2	497	141	638	387	—
Regular	3	663	65	728	91	2
Casual	74	1,723	282	2,005	484	122
Total	—	—	—	—	—	606
Vessels:						
Steam	—	13	—	13	—	—
Net tonnage	—	366	—	366	2	—
Motor	21	171	32	203	12	—
Net tonnage	300	2,022	255	2,277	—	—
Total vessels	21	184	32	216	2	—
Total net tonnage	300	2,388	255	2,643	12	—
Boats:						
Motor	2	232	70	302	220	95
Other	1	370	81	451	208	27
Apparatus:						
Haul seines	—	57	2	59	—	—
Length, yards	—	26,868	500	27,368	—	—
Gill nets:						
"Shoal," 2½ to 3½ inches	2,825	42,506	2,993	45,499	4,096	4,096
Square yards	565,000	8,509,400	769,300	9,278,700	1,515,300	1,515,300
"Shoal," 4 to 6 inches	1,875	4,20,183	3,196	5,378	2,109	2,375
Square yards	325,000	4,469,100	968,500	5,437,600	604,010	688,394
Trammel nets	—	6	—	600	—	—
Square yards	—	600	—	—	—	—
Lines:						
Trot	—	7,397	1,005	8,492	860	860
Hooks	—	2,248,050	278,800	2,526,800	41,675	41,675
Pound nets	—	345	96	441	—	—
Fyke nets	—	1,664	27	1,491	69	69
Crawfish pots	—	740	—	740	15	15
Crowfoot bars	—	15	—	—	—	—
111	—	—	—	—	—	—

LAKE FISHERIES, 1938—Continued  
Operating Units by Lakes

Item	Lake Ontario		Lake Erie		Lake Huron		Lake Michigan		Lake Superior		Lake of the Woods, Rainy Lake, and Namakan Lake		Totals
	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	
<b>Fishermen:</b>													
On vessels	11	264	121	1,031	189	—	—	—	—	—	—	1,616	
On boats and shore:	36	787	639	918	853	120	120	2	—	—	—	3,413	
Regular	120	420	134	953	318	—	—	—	—	—	—	1,947	
Casual	2	—	—	—	—	—	—	—	—	—	—	5,003	
<b>Totals</b>	<b>167</b>	<b>1,471</b>	<b>954</b>	<b>2,902</b>	<b>1,360</b>	<b>122</b>	<b>122</b>	<b>2</b>	<b>—</b>	<b>—</b>	<b>—</b>	<b>6,976</b>	
<b>Vessels:</b>													
Steam	—	13	5	22	4	—	—	—	—	—	—	44	
Net tonnage	—	305	81	499	134	—	—	—	—	—	—	1,019	
Motor	3	39	28	296	59	—	—	—	—	—	—	425	
Net tonnage	33	433	448	3,499	590	—	—	—	—	—	—	5,003	
Total vessels	3	52	33	318	63	—	—	—	—	—	—	469	
Total net tonnage	33	738	539	3,998	724	—	—	—	—	—	—	6,022	
<b>Boats:</b>													
Motor	44	304	260	447	512	95	95	27	—	—	—	1,662	
Other	72	383	253	545	379	—	—	—	—	—	—	1,659	
Apparatus:	—	—	—	—	—	—	—	—	—	—	—	325	
Haul seines	7	173	69	59	17	—	—	—	—	—	—	129,241	
Length, yards	583	74,416	33,605	27,233	3,404	—	—	—	—	—	—	—	
Gill nets:	—	—	—	—	—	—	—	—	—	—	—	—	
"Shoal," 2½ to 3¾ inches	1,337	21,740	2,870	64,588	11,939	—	—	—	—	—	—	102,474	
Square yards	218,070	3,435,000	574,000	12,859,300	3,147,600	—	—	—	—	—	—	20,233,700	
"Shoal," 4 to 6 inches	483	11,296	5,975	43,972	12,669	—	—	—	—	—	—	74,651	
Square yards	90,330	2,246,850	1,337,500	9,584,000	3,702,010	84,384	—	—	—	—	—	17,045,074	
"Shoal," 10 to 14 inches	34	8	—	—	—	—	—	—	—	—	—	42	
Bar nets	10,200	2,400	—	—	—	—	—	—	—	—	—	12,600	
Square yards	—	110	—	—	—	—	—	—	—	—	—	110	
Trammel nets	—	16,500	—	—	—	—	—	—	—	—	—	16,500	
Square yards	—	—	—	—	—	—	—	—	—	—	—	6	
Lines:	—	—	—	—	—	600	600	—	—	—	—	600	
Troll	—	—	—	—	—	75	75	—	—	—	—	75	
Hooks	—	—	—	—	—	525	525	—	—	—	—	525	
Trot	—	83	116	636	7,907	5,202	5,202	—	—	—	—	13,944	
Length, yards	16,600	25,290	180,900	2,483,450	1,049,575	232	232	—	—	—	—	3,684,725	
Pound nets	—	449	449	3,066	1,003	—	—	—	—	—	—	1,888	
Trap nets	140	6,105	3,066	276	1,564	53	53	—	—	—	—	9,311	
Fyke nets	145	794	—	740	62	—	—	—	—	—	—	2,906	
Crawfish pots	—	—	—	—	19	—	—	—	—	—	—	740	
Orownfoot bars	—	—	—	—	—	—	—	—	—	—	—	62	
Picks	—	—	—	—	—	—	—	—	—	—	—	19	

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LAKE FISHERIES OF THE UNITED STATES, 1938—Continued  
Operating Units of Lake Erie by Gear<sup>1</sup>

Item	Gill Nets			Bar Nets			Trot Lines			Pound Nets			Trap Nets			Fyke Nets			Total, Exclusive of Dupli- cation	
	Haul Seines	"Shoal" 2½ to 3¾ Inches	"Shoal" 4 to 6 Inches	"Shoal" 10 to 14 Inches	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number		
<b>Fishermen:</b>																				
On vessels	—	264	241	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	264	
On boats and shore:	146	79	47	1	1	1	12	6	43	7	20	524	76	94	45	—	—	—	787	
Regular	222	65	30	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	420	
Casual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	433	
<b>Total</b>	<b>368</b>	<b>408</b>	<b>318</b>	<b>2</b>	<b>19</b>	<b>49</b>	<b>49</b>	<b>27</b>	<b>600</b>	<b>600</b>	<b>139</b>	<b>139</b>	<b>1,471</b>							
<b>Vessels:</b>																				
Steam	—	13	12	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	13	
Net tonnage	—	305	273	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	305	
Motor	—	39	35	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	39	
Net tonnage	—	433	363	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	433	
Total vessels	—	52	47	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	52	
Total net tonnage	—	738	636	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	738	
Boats:	—	42	42	30	1	5</td														

LAKE FISHERIES OF THE UNITED STATES. 1938—Continued  
Operating Units of Lake Ontario by Gear<sup>1</sup>

Includes Niagara River below the falls, and the St. Lawrence River.

LAKE FISHERIES OF THE UNITED STATES, 1938—Continued  
Operating Units of Lake Huron by Gear

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LAKE FISHERIES OF THE UNITED STATES, 1938—Continued  
Operating Units of Lake Michigan by Gear

Item	Haul Seines	Gill Nets	Trammel Nets	Trot Lines	Pound Nets
	Number	"Shoal" 2 $\frac{1}{4}$ to 3 $\frac{3}{8}$ Inches	"Shoal" 4 to 6 Inches	Number	Number
<b>Fishermen:</b>					
On vessels	—	842	734	—	176 78
On boats and shore:					
Regular	61	560	395	4	74 326
Casual	105	507	313	5	33 136
<b>Totals</b>	<b>166</b>	<b>1,909</b>	<b>1,432</b>	<b>9</b>	<b>283 540</b>
<b>Vessels:</b>					
Steam	—	17	10	—	6 2
Net tonnage	—	349	297	—	167 28
Motor	—	246	206	—	46 26
Net tonnage	—	2,885	2,528	—	64 196
<b>Total vessels</b>	<b>—</b>	<b>—</b>	<b>—</b>	<b>—</b>	<b>—</b>
<b>Total net tonnage</b>	<b>—</b>	<b>—</b>	<b>—</b>	<b>—</b>	<b>—</b>
<b>Boats:</b>					
Motor	26	254	168	2	30 137
Other	67	257	123	6	44 137
Apparatus:					
Number	59	64,388	43,972	6	7,907 1,093
Length, yards	27,233	12,859	300	600	—
Square yards	—	9,589	—	—	—
Hooks	—	—	—	2,403,450	—

LAKE FISHERIES OF THE UNITED STATES, 1938—Continued  
Operating Units of Lake Michigan by Gear—Continued

Item	Fyke Nets	Crawfish Pots	Crawfoot Bars	Picks	By Hand	Totals, Exclusive of Dupli- cation
	Number	Number	Number	Number	Number	Number
<b>Fishermen:</b>						
On vessels	53	—	—	—	—	1,031
On boats and shore:						
Regular	193	—	—	—	—	918
Casual	60	5	55	19	11	953
<b>Totals</b>	<b>306</b>	<b>5</b>	<b>55</b>	<b>19</b>	<b>11</b>	<b>2,902</b>
<b>Boats:</b>						
Steam	1	—	—	—	—	22
Net tonnage	13	—	—	—	—	499
Motor	20	—	—	—	—	296
Net tonnage	161	—	—	—	—	3,499
<b>Total vessels</b>	<b>21</b>	<b>—</b>	<b>—</b>	<b>—</b>	<b>—</b>	<b>318</b>
<b>Total net tonnage</b>	<b>174</b>	<b>—</b>	<b>—</b>	<b>—</b>	<b>—</b>	<b>3,998</b>
Boats:						
Motor	78	2	45	10	—	447
Other	109	5	17	6	11	545
Apparatus, number	1,564	740	62	19	—	—

LAKE FISHERIES OF THE UNITED STATES, 1938—Continued  
Operating Units of Lake Superior by Gear

Item	Haul Seines	Gill Nets		Lines		Pound Nets	Fyke Nets	Totals, Exclusive of Duplication
		"Shoal" 2 $\frac{1}{4}$ to 3 $\frac{1}{2}$ Inches	"Shoal" 4 to 6 Inches	Troll	Trot			
Number	Number	Number	Number	Number	Number	Number	Number	Number
<b>Fishermen:</b>								
On vessels	—	107	120	—	110	21	8	189
On boats and shore:								
Regular	26	685	437	18	308	97	2	853
Casual	20	224	182	14	78	28	6	318
<b>Totals</b>	<b>46</b>	<b>1,016</b>	<b>739</b>	<b>32</b>	<b>496</b>	<b>146</b>	<b>16</b>	<b>1,360</b>
<b>Vessels:</b>								
Steam	—	1	4	—	3	1	—	4
Net tonnage	—	24	134	—	108	24	—	134
Motor	—	37	34	—	28	7	4	59
Net tonnage	—	334	331	—	306	59	22	590
Total vessels	—	38	38	—	31	8	4	63
Total net tonnage	—	358	465	—	414	83	22	724
<b>Boats:</b>								
Motor	10	396	291	—	10	189	44	512
Other	10	312	155	—	58	33	3	379
Apparatus:	—	—	—	—	—	—	—	—
Number	17	11,939	12,669	75	5,202	232	33	—
Length, yards	—	—	—	—	—	—	—	—
Square yards	3,404	3,147,600	3,702,910	525	1,049,575	—	—	—
Hooks	—	—	—	—	—	—	—	—

LAKE FISHERIES OF THE UNITED STATES, 1938—Concluded  
Operating Units of Lake of the Woods, Rainy Lake, and Namakan Lake by Gear

Item	Gill Nets, "Shoal," 4 to 6 Inches		Pound Nets	Fyke Nets	Totals, Exclusive of Duplication
	Number	Number			
Fishermen, on boats and shore:					
Regular	—	90	—	29	120
Casual	—	2	—	—	2
<b>Totals</b>		<b>92</b>	<b>34</b>	<b>29</b>	<b>122</b>
<b>Boats:</b>					
Motor	—	74	21	23	95
Other	—	14	7	11	27
Apparatus:					
Number	—	266	69	93	—
Square yards	—	84,384	—	—	—

LAKE FISHERIES, 1939  
Catch by States

Species	New York		Pennsylvania		Ohio		Michigan		Indiana	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Blue pike	631,000	\$83,100	1,257,200	\$62,381	7,263,200	\$581,056	—	—	—	—
Bowfin	200	2	35,600	376	385,400	6,768	9,100	\$125	—	—
Burbot	11,000	220	4,900	58	1,843,400	55,302	8,000	213	—	—
Carp	927,400	37,100	7,515	187	373,900	50,824	1,406,600	48,162	2,000	\$40
Catfish and bullheads	50,100	—	3,400	—	—	—	207,200	39,980	7,000	210
Chubs	—	—	—	—	228,200	24,796	1,174,300	187,603	151,000	24,160
Cisco	480,400	72,060	5,335	—	—	—	—	—	—	—
Eels	36,900	5,335	—	—	—	—	11,535	—	—	—
Gizzard shad	—	—	—	—	152,900	6,116	10,800	300	18	—
Goldfish	—	—	—	—	—	—	11,603,800	362,702	432	—
Lake herring	200	10	—	—	—	—	6,083,700	1,175,070	153,300	7,665
Lake trout	16,400	3,280	—	—	20,000	1,000	—	—	205,000	41,000
Minnows	—	—	—	—	—	—	—	—	—	—
Mooneye	—	—	—	—	—	—	—	—	—	—
Pike or pickerel (jacks)	10,600	1,060	—	—	—	—	—	—	—	—
Rock bass	4,800	288	—	—	—	—	—	—	—	—
Sauger	100	10	—	—	—	—	—	—	—	—
Sheepshead	500	15	27,300	395	3,297,900	1,661,100	166,110	—	—	—
Snelt	—	—	—	—	—	—	98,937	85,900	8,120	—
Steelhead trout	—	—	—	—	—	—	—	580,100	3,742	—
Sturgeon	22,500	6,750	600	153	8,900	2,670	—	—	23,204	800
Sucker "mullet"	81,200	3,748	11,800	140	918,800	36,752	2,713,200	80,591	100	160
White bass	29,900	1,740	—	—	—	—	—	—	—	4
White bass	900	54	63,200	1,494	626,300	37,578	22,600	1,356	—	—
Whitefish:	—	—	—	—	—	—	—	—	—	—
Common	226,700	45,340	980,000	131,115	994,500	198,900	1,480,500	206,088	—	—
Menominee	—	—	—	—	—	—	—	—	—	—
Yellow perch	53,900	4,312	80,400	—	1,403,100	149,310	1,198,200	11,610	—	—
Yellow pike	11,500	1,380	63,900	5,401	4,442,700	355,416	1,939,100	95,956	85,900	8,500
Muscle shells <sup>1</sup>	—	—	—	—	—	—	181,800	3,361	—	—
Pearls and slugs <sup>1</sup>	—	—	—	—	—	—	—	87	—	—
Totals	2,595,400	\$253,019	2,761,500	\$230,821	23,512,000	\$1,767,274	20,047,200	\$2,531,238	605,100	\$81,829

<sup>1</sup> From tributary streams.

Note: Statistics in the above table do not include the catch of smelt by dip nets since data on that fishery are not available.

Total Pounds Value Pounds Value Pounds Value Pounds Value Pounds Value

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LAKE FISHERIES, 1939—Continued  
Catch by States—Concluded

Species	Illinois		Wisconsin		Minnesota		Totals	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Blue pike	—	—	—	—	—	—	—	—
Bowfin	5,000	\$100	400	400	50,300	\$8,620	50,300	\$8,620
Carp	—	—	1,601,300	31,000	48,039	10,300	228	483,300
Catfish and bullheads	527,200	84,352	1,15,500	2,539,300	11,325	42,100	2,268	5,214
Chubs	—	—	—	—	404,614	47,800	—	4,439,600
Cisco	—	—	—	—	—	—	68	785,500
Crappie	—	—	—	—	—	—	—	108,391
Eels	—	—	—	—	—	—	—	5,535
Garfish	—	—	—	—	—	—	—	11
Gizzard shad	—	—	—	—	—	—	—	300
Goldfish	164,600	8,230	4,410,800	145,246	6,500,200	117,998	22,922,900	641,851
Lake herring	318,500	63,700	2,819,800	559,496	348,600	44,160	9,792,000	1,885,706
Lake trout	—	—	—	—	—	—	—	20,000
Minnows	—	—	—	—	—	—	—	1,000
Mooneyes	—	—	—	—	—	—	—	16
Pike or pickerel (jacks)	—	—	20,400	1,982	170,900	5,152	237,900	11,700
Rock bass	—	—	—	—	68,500	2,778	1,810,900	1,404
Sauger	—	—	—	—	—	—	—	177,018
Sheepshead	—	—	—	—	—	—	—	138,321
Snelt	—	—	11,600	292	—	—	3,528,100	78,352
Steelhead trout	—	—	1,378,700	55,148	—	—	1,958,800	713,800
Sturgeon	—	—	732,000	21,647	172,500	57	4,619,600	9,630
Sucker "mullet"	—	—	—	—	931,300	2,269	1,300,000	144,651
Tulibees	—	—	800	48	—	—	931,300	1,740
White bass	—	—	—	—	—	—	—	23,372
Whitefish:	—	—	217,100	41,292	82,100	7,631	3,980,900	720,366
Common	—	—	16,200	1,620	55,500	306	137,800	13,536
Menominee	243,900	19,512	2,145,900	171,600	53,700	1,946	5,384,100	455,551
Yellow perch	—	—	36,300	3,014	385,300	35,158	6,881,800	594,279
Yellow pike	—	—	4,13,800	4,966	—	—	3,100	248
Crappie	—	—	—	—	—	—	505,600	8,527
Muscle shells <sup>1</sup>	—	—	—	—	—	—	—	87
Pearls and slugs <sup>1</sup>	—	—	—	—	—	—	—	—
Totals	1,259,200	\$175,894	16,494,200	\$1,473,186	8,960,200	\$249,178	85,234,800	\$6,742,439

<sup>1</sup> From tributary streams.

Note: Statistics in the above table do not include the catch of smelt by dip nets since data on that fishery are not available.

**LAKE FISHERIES, 1939—Continued**  
**Catch by Lakes**

Species	Lake Ontario			Lake Erie			Michigan			Totals		
	New York	Pennsylvania	Ohio	New York	Pennsylvania	Ohio	Pounds	Value	Pounds	Pounds	Value	Pounds
Blue pike -----	102,100	\$10,210	528,400	\$52,890	1,257,200	—	812,481	7,263,200	—	—	9,049,300	\$496,327
Bowfin -----	200	2	—	—	—	—	—	—	5,500	5,500	5,500	5,5
Burbot -----	180	2,000	40	37,600	376	6,768	100	338,400	55,302	378,100	2	7,186
Carp -----	36,688	10,300	412	4,900	58	1,843,400	400	586,400	54,300	2,445,000	23	79,228
Catfish and bullheads	48,700	7,305	210	3,400	187	373,900	900	59,824	11,335	433,000	8,145	68,366
Cisco -----	68,800	10,320	411,600	61,740	228,200	24,796	76,900	—	—	716,700	98,071	98,071
Eels -----	36,900	5,535	—	—	—	—	—	—	—	—	—	—
Goldfish -----	—	—	—	—	—	—	—	—	—	—	—	—
Lake herring -----	200	10	—	—	—	—	—	—	—	—	—	—
Lake trout -----	16,400	3,280	—	—	—	—	—	—	—	—	—	—
Minnows -----	—	—	—	—	—	—	—	—	—	—	—	—
Mooneye -----	—	—	—	—	—	—	—	—	—	—	—	—
Pike or pikerel (jacks)	10,600	1,000	—	—	—	—	—	—	—	—	—	—
Rock bass -----	4,800	288	—	—	—	—	—	—	—	—	—	—
Sauger -----	—	—	100	10	—	—	—	1,661,100	163,110	7,910	7,910	174,030
Sheepshead -----	—	—	500	15	27,300	3,207,900	98,937	168,100	—	3,362	3,493,800	102,709
Sturgeon -----	15,600	4,680	6,900	2,070	600	153	8,900	2,670	—	—	16,400	4,893
Sucker "mullet"	54,000	2,160	27,200	1,088	11,800	140	918,800	36,752	50,500	1,010	1,008,300	38,990
Sunfish -----	28,700	1,722	300	18	—	—	—	—	—	—	—	18
White bass -----	500	400	24	63,200	1,494	626,300	37,578	21,700	1,302	711,600	40,398	40,398
Whitefish, common	103,700	20,740	123,000	24,600	980,000	131,115	914,500	198,900	600	108	2,098,100	354,723
Yellow perch -----	32,500	2,600	21,400	1,712	80,400	4,325	1,493,100	149,310	12,900	1,032	1,607,800	156,379
Yellow pike -----	6,200	744	5,300	636	636	5,401	4,442,700	355,416	252,500	25,250	4,767,400	386,703
Totals -----	1,456,100	\$107,574	1,139,300	\$145,465	2,761,500	\$230,821	23,512,000	\$1,767,274	1,250,600	\$72,714	28,663,400	\$2,216,274

Note: Statistics in the above table do not include the catch of smelt by dip nets since data on that fishery are not available.

**LAKE FISHERIES, 1939—Continued**  
**Catch by Lakes—Continued**

Totals ----- 13,

LAKE FISHERIES, 1939—Continued  
Catch by Lakes—Concluded

Species	Lake Superior				Lake of the Woods, Rainy Lake, and Namakan Lake				Total, All Lakes	
	Michigan	Wisconsin	Minnesota	Totals	Michigan	Wisconsin	Minnesota	Totals		
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Blue pike	—	—	—	—	—	—	—	—	—	—
Bowfin	2,400	\$48	1,000	\$20	—	—	—	—	50,300	\$573
Carp	100	3	—	—	—	—	3,400	\$68	48,300	9,700
Catfish and bullheads	28,500	4,275	164,400	24,840	47,800	\$5,214	100	3	10,300	5,801,000
Chubs	—	—	—	—	—	—	—	—	42,100	2,268
Cisco	—	—	—	—	—	—	—	—	—	—
Croppie	—	—	—	—	—	—	—	—	34,149	—
Eels	—	—	—	—	—	—	—	—	—	—
Ganfish	—	—	—	—	—	—	—	—	—	—
Gizzard shad	—	—	—	—	—	—	—	—	—	—
Goldfish	—	—	—	—	—	—	—	—	—	—
Lake herring	3,357,000	102,310	3,118,600	93,558	6,590,300	117,998	13,065,800	313,896	—	—
Lake trout	1,934,000	348,130	461,600	73,854	348,600	44,160	2,744,200	466,146	—	—
Minnows	—	—	—	—	—	—	—	—	—	—
Morone	—	—	—	—	—	—	—	—	—	—
Pike or pickerel (Jacks)	1,200	96	2,900	252	100	5	4,200	333	170,800	5,147
Rock bass	—	—	—	—	—	—	—	—	—	—
Sauger	—	—	—	—	—	—	—	—	68,500	2,778
Sheepshead	—	—	—	—	—	—	—	—	—	—
Smelt	—	—	—	—	—	—	—	—	—	—
Steelhead trout	—	—	—	—	—	—	—	—	—	—
Sturgeon	—	—	—	—	—	—	—	—	—	—
Sucker "mullet,"	118,700	3,561	31,300	626	9,200	206	159,200	4,393	163,300	2,063
Sunfish	—	—	—	—	—	—	—	—	—	—
Tulibees	—	—	—	—	—	—	—	—	—	—
White bass	—	—	—	—	—	—	—	—	—	—
Whitefish:	—	—	—	—	—	—	—	—	—	—
Common	384,800	76,960	106,400	19,152	5,800	683	497,000	96,795	76,300	6,948
Menominee	20,000	2,000	1,400	140	5,500	306	26,900	2,446	53,700	—
Sucker "mullet,"	5,000	500	—	—	—	—	5,000	500	385,300	35,158
Yellow perch	5,600	560	30,800	2,464	—	—	36,400	3,024	—	—
Yellow pike	—	—	—	—	—	—	—	—	—	—
Crawfish	—	—	—	—	—	—	—	—	—	—
Mussel shells <sup>1</sup>	—	—	—	—	—	—	—	—	—	—
Pearls and shucks <sup>1</sup>	—	—	—	—	—	—	—	—	—	—
Totals	124	5,857,300	\$538,443	3,918,400	\$214,708	7,007,200	\$168,572	16,782,900	\$80,217,23	1,953,000
										\$80,606

<sup>1</sup> From tributary streams.

Note: Statistics in the above table do not include the catch of smelt by dip nets since data on that fishery are not available.

LAKE FISHERIES, 1913-1939  
(Expressed in thousands of pounds; that is 000 omitted)

Catch by Lakes

Year	Lake Ontario <sup>1</sup>				Lake Huron				Lake Michigan				Lake Superior				Lake of the Woods, Rainy Lake and Namakan Lake <sup>2</sup>				Totals
	Lake Ontario	Lake Erie	Lake Huron	Lake Michigan	Lake Huron	Lake Michigan	Lake Superior	Lake Michigan	Lake Superior	Lake Michigan											
1913	210	3—	11,184	26,994	—	—	—	—	—	—	6,417	—	—	—	—	—	—	—	—	—	1,384
1914	277	53,571	8,248	28,195	—	—	—	—	—	—	7,088	—	—	—	—	—	—	—	—	—	98,625
1915	305	56,509	10,245	31,680	—	—	—	—	—	—	5,694	—	—	—	—	—	—	—	—	—	108,948
1916	317	41,223	17,145	23,023	—	—	—	—	—	—	5,437	—	—	—	—	—	—	—	—	—	88,432
1917	656	41,416	12,512	29,317	—	—	—	—	—	—	9,889	—	—	—	—	—	—	—	—	—	95,803
1918	524	51,479	14,964	26,675	—	—	—	—	—	—	11,546	—	—	—	—	—	—	—	—	—	106,671
1919	472	35,134	15,240	29,820	—	—	—	—	—	—	10,500	—	—	—	—	—	—	—	—	—	92,463
1920	314	32,192	11,250	23,053	—	—	—	—	—	—	9,267	—	—	—	—	—	—	—	—	—	77,375
1921	1,853	46,731	9,330	17,018	—	—	—	—	—	—	7,476	—	—	—	—	—	—	—	—	—	83,458
1922	889	40,912	13,481	16,905	—	—	—	—	—	—	6,569	—	—	—	—	—	—	—	—	—	79,434
1923	710	44,378	9,920	15,358	—	—	—	—	—	—	7,584	—	—	—	—	—	—	—	—	—	79,109
1924	1,049	40,264	9,074	17,694	—	—	—	—	—	—	8,944	—	—	—	—	—	—	—	—	—	78,281
1925	446	20,639	6,367	21,710	—	—	—	—	—	—	12,307	—	—	—	—	—	—	—	—	—	69,132
1926	788	25,057	13,132	20,495	—	—	—	—	—	—	13,436	—	—	—	—	—	—	—	—	—	75,300
1927	698	26,187	13,711	23,681	—	—	—	—	—	—	15,302	—	—	—	—	—	—	—	—	—	81,327
1928	854	19,643	9,943	17,999	—	—	—	—	—	—	13,132	—	—	—	—	—	—	—	—	—	63,388
1929	948	18,547	10,477	15,614	—	—	—	—	—	—	17,148	—	—	—	—	—	—	—	—	—	55,38

LAKE FISHERIES, 1939—Continued  
Operating Units by States

Item	New York	Pennsylvania	Ohio	Michigan	Indiana	Illinois	Wisconsin	Minnesota	Totals
	Number	Number	Number	Number	Number	Number	Number	Number	Number
<b>Fishermen:</b>									
On vessels	61	129	101	603	29	77	634	6	1,640
On boats and shore:									
Regular	102	38	620	1,684	16	2	657	547	3,666
Casual	187	15	280	685	12	6	764	135	2,084
Totals	350	182	1,001	2,972	5	85	2,055	688	7,390
<b>Vessels:</b>									
Steam:									
5 to 9 tons									
10 to 19 tons									
20 to 29 tons									
30 to 39 tons									
40 to 49 tons									
50 to 59 tons									
Totals	1	8	3	17	1	—	12	—	42
Net tonnage	24	157	96	326	22	—	355	—	980
<b>Motor:</b>									
5 to 9 tons	10	8	12	72	3	7	110	2	224
10 to 19 tons	2	7	7	54	4	9	71	—	154
20 to 29 tons	1	1	1	18	1	7	16	—	44
30 to 39 tons	—	—	—	5	—	—	3	—	10
40 to 49 tons	—	—	—	1	—	—	1	—	2
Totals	12	17	21	151	8	23	202	2	436
Net tonnage	97	197	224	1,882	87	328	2,258	12	5,065
Total vessels	13	25	24	168	9	23	214	2	478
Total net tonnage	121	354	320	2,208	100	328	2,613	12	6,075
<b>Boats:</b>									
Motor	73	14	24	819	6	4	352	337	1,846
Other	101	10	291	651	5	3	484	256	1,801

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LAKE FISHERIES, 1939—Continued  
Operating Units by States—Concluded

Item	New York	Pennsylvania	Ohio	Michigan	Indiana	Illinois	Wisconsin	Minnesota	Totals
	Number	Number	Number	Number	Number	Number	Number	Number	Number
<b>Apparatus:</b>									
Haul seines	13	—	89	82	1	—	58	—	243
Length, yards	2,741	—	61,100	42,634	300	—	25,900	—	132,675
Gill nets:									
"Shoal," 2½ to 3½ inches	4,562	6,500	5,200	28,462	1,575	3,975	45,827	4,862	100,963
"Shoal," 4 to 7 inches	78,400	960,000	772,300	5,581,900	315,000	800,000	8,264,900	738,600	18,224,300
Square yards	5,325	7,350	4,700	34,890	925	1,675	22,080	2,517	79,692
Square yards	1,065,000	1,510,000	725,000	8,243,000	185,000	335,000	5,113,500	733,180	17,909,680
"Shoal," 10 to 14 yards	43	—	—	—	—	—	—	—	43
Square yards	13,200	—	—	—	—	—	—	—	13,200
Trammel nets	—	—	—	—	—	—	6	—	6
Square yards	—	—	—	—	—	—	600	—	600
Bar nets	—	—	100	—	—	—	—	—	100
Square yards	—	—	15,000	—	—	—	—	—	15,000
Lines:									
Troll	—	—	—	75	—	—	—	—	75
Hooks	—	—	—	525	—	—	—	—	525
Trot	100	—	—	6,296	—	—	8,144	—	15,615
Hooks	25,950	—	—	1,716,400	4	—	1,885,900	109,500	3,737,750
Pound nets	—	42	—	1,354	—	—	—	68	1,959
Trap nets	149	—	5,383	3,249	—	—	—	—	525
Fyke nets	121	—	492	684	—	—	—	—	8,781
Crawfish pots	—	—	—	—	42	—	—	1,565	2,960
Crowfoot harps	—	—	—	—	15	—	—	600	600
Picks	—	—	—	—	—	—	—	—	72

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LAKE FISHERIES, 1939—Continued  
Operating Units by Lakes

Item	Lake Ontario	Lake Erie	Lake Huron	Lake Michigan	Lake Superior	Lake of the Woods, Rainy Lake, and Namakan Lake	Totals
	Number	Number	Number	Number	Number	Number	Number
<b>Fishermen:</b>							
On vessels	8	283	126	1,036	187	—	1,640
On boats and shore	—	—	—	—	—	—	—
Regular	46	807	757	1,002	920	134	3,666
Casual	115	427	156	1,060	384	2	2,084
<b>Totals</b>	<b>169</b>	<b>1,517</b>	<b>1,089</b>	<b>3,038</b>	<b>1,491</b>	<b>136</b>	<b>7,390</b>
<b>Vessels:</b>							
Steam:	—	—	1	3	—	—	4
5 to 9 tons	—	3	3	8	—	—	14
10 to 19 tons	—	6	—	3	3	—	13
20 to 29 tons	—	2	4	4	4	—	6
30 to 39 tons	—	3	—	3	—	—	3
40 to 49 tons	—	—	—	1	1	—	2
50 to 59 tons	—	—	—	—	—	—	—
<b>Totals</b>	<b>—</b>	<b>12</b>	<b>5</b>	<b>21</b>	<b>4</b>	<b>—</b>	<b>42</b>
Net tonnage	277	81	488	134	—	—	980
Motor:	—	—	—	—	—	—	—
5 to 9 tons	1	29	13	140	41	—	224
10 to 19 tons	1	15	8	118	12	—	154
20 to 29 tons	2	2	4	34	4	—	44
30 to 39 tons	—	—	—	—	—	—	—
40 to 49 tons	—	—	—	—	—	—	—
50 to 59 tons	—	—	—	—	—	—	—
<b>Totals</b>	<b>—</b>	<b>2</b>	<b>48</b>	<b>30</b>	<b>1</b>	<b>—</b>	<b>2</b>
Net tonnage	23	495	469	308	3,327	—	—
Total vessels	2	60	35	319	58	—	436
Total net tonnage	23	772	550	4,015	62	—	5,095
Boats:	—	—	—	—	—	—	—
Motor	49	303	296	538	567	38	478
Other	68	386	303	579	435	30	6,075

Item	Lake Ontario	Lake Erie	Lake Huron	Lake Michigan	Lake Superior	Lake of the Woods, Rainy Lake, and Namakan Lake	Totals
	Number	Number	Number	Number	Number	Number	Number
<b>Apparatus:</b>							
Haul seines	7	116	47	58	15	—	243
Length, yards	2,225	70,116	31,165	25,765	3,404	—	132,675
Gill nets:	—	—	—	—	—	—	—
"Shoal," 2½ to 3½ inches	1,062	15,405	2,790	68,044	13,662	—	100,963
Square yards	177,400	2,387,500	558,000	12,393,300	2,708,100	—	18,224,300
"Shoal," 4 to 7 inches	625	17,105	6,600	42,605	12,375	352	79,662
Square yards	125,000	3,296,000	1,457,500	9,240,000	3,761,500	119,680	17,909,680
"Shoal," 10 to 14 inches	35	8	—	—	—	—	43
Square yards	10,800	2,104	—	—	6	—	13,200
Trammel nets	—	—	—	—	600	—	600
Square yards	—	—	—	—	—	—	100
Bar nets	—	100	—	—	—	—	15,000
Square yards	—	15,000	—	—	—	—	—
Lines:	—	—	—	—	—	—	—
Troll hooks	—	—	—	—	75	—	75
Trot hooks	79	41	1,124	7,508	525	—	525
Pound nets	15,880	16,100	333,800	1,748,900	6,863	—	15,615
Trap nets	—	42	464	1,623,100	254	—	3,737,750
Fyke nets	141	5,611	3,029	1,131	—	68	1,959
Crawfish pots	120	803	266	1,652	21	98	8,781
Crowfoot bars	—	—	—	600	—	2,960	2,960
Picks	—	—	—	72	—	600	600
	—	—	—	15	—	72	15

LAKE FISHERIES, 1939—Concluded  
Operating Units by Lakes—Concluded

Item	Lake Ontario	Lake Erie	Lake Huron	Lake Michigan	Lake Superior	Lake of the Woods, Rainy Lake, and Namakan Lake	Totals
	Number	Number	Number	Number	Number	Number	Number
<b>Apparatus:</b>							
Haul seines	7	116	47	58	15	—	243
Length, yards	2,225	70,116	31,165	25,765	3,404	—	132,675
Gill nets:	—	—	—	—	—	—	—
"Shoal," 2½ to 3½ inches	1,062	15,405	2,790	68,044	13,662	—	100,963
Square yards	177,400	2,387,500	558,000	12,393,300	2,708,100	—	18,224,300
"Shoal," 4 to 7 inches	625	17,105	6,600	42,605	12,375	352	79,662
Square yards	125,000	3,296,000	1,457,500	9,240,000	3,761,500	119,680	17,909,680
"Shoal," 10 to 14 inches	35	8	—	—	—	—	43
Square yards	10,800	2,104	—	—	6	—	13,200
Trammel nets	—	—	—	—	600	—	600
Square yards	—	—	—	—	—	—	100
Bar nets	—	100	—	—	—	—	15,000
Square yards	—	15,000	—	—	—	—	—
Lines:	—	—	—	—	—	—	—
Troll hooks	—	—	—	—	75	—	75
Trot hooks	79	41	1,124	7,508	525	—	525
Pound nets	15,880	16,100	333,800	1,748,900	6,863	—	15,615
Trap nets	—	42	464	1,623,100	254	—	3,737,750
Fyke nets	141	5,611	3,029	1,131	—	68	1,959
Crawfish pots	120	803	266	1,652	21	98	8,781
Crowfoot bars	—	—	—	600	—	2,960	2,960
Picks	—	—	—	72	—	600	600
	—	—	—	15	—	72	15

**END OF YEAR**